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NOTES ON SOME OF THE RARER BIRDS OF  
MASSACHUSETTS.\*

BY J. A. ALLEN.



THE Natural History of any portion of country cannot, of course, be too fully known; and the few ornithological notes at this time presented I feel sure will be acceptable to those who are interested in the study of the New England birds. While a large portion of the facts now communicated are of my own observing I am greatly indebted to the kindness of other persons for many of the interesting notes that, during the last five years, have been accumulating in my note-book. As the authorities upon which the observations not my own in the following pages are communicated are always indicated, I have here but to return thanks to my numerous ornithological correspondents and friends who have so generously favored me from time to time with their valuable contributions. Only by knowing thoroughly the fauna of a locality can the subsequent changes in it, induced by its becoming more densely settled, or by

\* A supplement to a Catalogue of the Birds of Massachusetts, published five years since by the writer in the fourth volume of the Proceedings of the Essex Institute.

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other causes, be traced. As is well known, the mammalian and bird faunæ of all the older settled parts of the United States are vastly different from what they were two hundred years ago. These changes consist mainly in the great decrease in numbers of the representatives of all the larger species, not a few of which are already extirpated where they were formerly common; a few of the smaller species of both classes have doubtless increased in numbers. Two causes operate unfavorably upon the larger ones; the deforesting of the country and the sporting propensities of the people, everything large enough to be shot, whether useful or otherwise, being considered as legitimate game. The former destroys the natural haunts of many species, while the latter destroys and drives away others that would otherwise remain. Many of the water-fowl that are now only transient visitors, as the Canada Goose, the several species of Merganser, Teals, Black Duck and Mallard, undoubtedly once bred in this State, as did also the Wild Turkey and the Prairie Hen. Several of the Gulls and probably some of the *Tringæ* have been driven, like the Ducks and Geese, to seek more northern breeding grounds. In comparatively recent times, geologically speaking, probably other causes, as climatic, have been operating to effect a gradual northward migration, in certain species at least. These changes are of great interest, not only generally, but in a scientific point of view, and we shall be able to trace them and their causes only by comparing, from time to time, exhaustive faunal records of the same localities.

In a district so little diversified as that portion of Massachusetts lying east of the Connecticut River, it is perhaps a little unexpected that marked discrepancies should occur in the observations made at adjoining localities by equally competent naturalists, in respect to the relative abundance of certain species. As every experienced observer must have noticed that the birds of passage, as many of the Warblers especially, vary greatly in numbers in different

years, and in the time occupied by them in passing a given locality, it is less surprising that at different points they should vary in abundance the same year. Among the birds that regularly breed in the district in question, there are some that are not equally common at all points. The Savannah Sparrow (*Passerculus savanna*), for instance, that along the coast and on the islands is one of the most common species of its family during the summer, is almost unknown at this season in the interior of the state, although a species that at different seasons of the year is found throughout nearly the whole continent. The Swamp Sparrow (*Melospiza palustris*) is likewise locally restricted, for while a common summer bird in many of the larger swamps in the eastern part of the state, as the Fresh Pond marshes in Cambridge, it has thus far escaped the detection of very expert observers in the interior and western part. The Yellow-winged Sparrow (*Coturniculus passerinus*) is likewise partial to peculiar localities, preferring apparently sandy plains and dry open pastures; while it is one of the most numerous summer sparrows about Springfield, on Cape Cod and at Nantucket, it is generally much more rarely observed in the eastern counties of the state, where at some localities it is deemed rare. The same remarks apply to other species, as the Solitary and White-eyed Vireos (*Lani-vireo solitarius* and *Vireo Novæboracensis*), etc. The Prairie Warbler (*Dendroica discolor*) is much more at home in old pastures partially grown up to barberries and cedars than elsewhere. The Song Sparrow (*Melospiza melodia*), generally so numerous everywhere, I found last year was one of the rarest sparrows on the islands and extreme coast border, where its relative, the Savannah, was so common.

Birds, as probably other animals, are not quite so invariable in their habits as has been commonly supposed, nor in the precise character of their notes and songs, or the situation and materials of which they compose their nests. Hence one should not rashly question the accounts given by usually

reliable authorities, because in particular instances they do not accord with their own observations. Neither should differences in habits, in song, etc., be taken as infallible evidence of a difference of species. It is well known that in Massachusetts the Brown Thrush (*Harporhynchus rufus*) is not uniform in the location of its nest, as about Springfield it almost invariably builds on the ground (in the many scores of nests that I have seen there I have met with but a single exception), while in other localities it as invariably places its nest a little above the ground in bushes. At Evanston, Ill., I once found one in an oak higher than I could reach; the locality, however, was swampy. How universally the Chipping Sparrow (*Spizella socialis*) breeds in trees, and generally at an elevation of several feet, is well known, but several authentic instances of this bird's nesting on the ground have come to my knowledge, one of which I myself discovered. Variations of this character in other species are of occasional occurrence, examples of which have doubtless been met with by every experienced collector.

The materials which birds select in the construction of their nests are well known to vary in different localities; the greater care exhibited by some species to secure a soft warm lining at the north that are much less precautions in this respect at the south, is already a recorded fact. Aside from this, the abundance of certain available materials occurring at only particular localities gives a marked character to the nests there built, which serves to distinguish them from those from other points. Some of the Thrushes, for instance, make use of a peculiar kind of moss at some localities that elsewhere, from its absence, are compelled to substitute for it fine grass or dry leaves. At Ipswich, on Cape Cod, and perhaps generally in the immediate vicinity of the sea, the Purple Grackles (*Quiscalus versicolor*) and Red-winged Blackbirds (*Agelaius phoeniceus*), and in fact numerous other species, in building their nests often use little else than dry eel-grass or "sea-wrack," which results in



nest-structures widely different in appearance from those of their relatives residing in the interior. Every egg-collector is aware of the wide variations eggs of the same set may present, not only in the markings and in the tint of the ground color, but in size and form, and especially how wide these differences sometimes are in eggs of different birds of the same species. Also how different the behavior of the bird is when its nest is approached, in some cases the parents appearing almost utterly regardless of their own safety in their anxiety for their eggs or helpless young, while other parents of the same species quietly witness the robbing of their nest at a safe distance, and evince no extraordinary emotion. Those who have witnessed this, and have also watched the behavior of birds when undisturbed in their quiet retreats, will grant, I think, the same diversity of disposition and temperament to obtain among birds that is seen in man himself.

In respect to the songs of birds, who that has attentively listened to the singing of different Robins, Wood Thrushes or Purple Finches, has not detected great differences in the vocal powers of rival songsters of the same species? Different individuals of some species, especially among the Warblers, sing so differently that the expert field ornithologist is often puzzled to recognize them; especially is this so in the Black and White Creeper (*Mniotilta varia*) and the Black-throated Green Warbler (*Dendroica virens*). But the strangest example of this sort I have noticed I think was the case of an Oriole (*Icterus Baltimore*) that I heard at Ipswich last season. So different were its notes from the common notes of the Baltimore that I failed entirely to refer them to that bird till I saw its author. So much, however, did it resemble a part of the song of the Western Meadow Lark (*Sturnella magna*; *S. neglecta* Aud.) that it at once not only recalled that bird, but the wild, grassy, gently undulating primitive prairie landscape where I had heard it, and with which the loud, clear, rich, mellow tones of this beau-

tiful songster so admirably harmonize. This bird I repeatedly recognized from the peculiarity of its notes during my several days stay at this locality. Aside from such unusual variations as this, which we may consider as accidental, birds of unquestionably the same species, as the Crow, the Blue Jay, the Towhee and others, at remote localities, as New England, Florida, Iowa, etc., often possess either general differences in their notes and song, easily recognizable, or certain notes at one of these localities never heard at the others, or an absence of some that are elsewhere familiar. This is perhaps not a strange fact, since it is now so well known that birds of the same species present certain well marked variations in size according to the latitude and elevation above the sea of the locality at which they were born, and that they vary considerably, though doubtless within a certain range, in many structural points at one and the same locality. In other words, since it is known that all the different individuals of a species are not exactly alike, as though all were cast in the same die, as some naturalists appear to have believed.

Certain irregularities in the breeding range of birds have also come to light. It is perhaps not remarkable that a pair of birds of species that regularly breed in northern New England should now and then pass the summer and rear their young in the southern part, as has been the case in certain known instances in the Snow Bird (*Junco hyemalis*), the Pine Finch (*Chrysomitris pinus*), and the White-throated Sparrow (*Zonotrichia albicollis*); but it is otherwise with the Snow Bunting (*Plectrophanes nivalis*), which rarely breeds south of Labrador, of which there is a single well authenticated instance of its breeding near Springfield. The casual visits of northern birds in winter, which we may suppose sometimes results from their being driven south by want of food or the severity of the season, are also less remarkable, it appears to me, than the occurrence here of southern species, as of the two Egrets, the Little Blue Heron

(*Florida cærulea*) the Gallinules and other aquatic species, which never, so far as known (with one exception perhaps), breed so far north. In the latter case they are generally young birds that reach us towards fall in their chance wanderings.

It may here be added that the cause of the migration of our birds still offers an interesting field for investigation. Observers are of late noting that in the case of some northern species that reach us only occasionally in their winter migrations, young birds only are at first seen, but if the migration continues the older birds appear at a later date. But sometimes young birds only are seen. This frequently happens in the case of the Pine Grosbeak (*Pinicola enucleator*). The cause of their visits is not always, it is evident, severe weather; the last named species appearing sometimes in November,—weeks before severe cold sets in—while at other times it is not seen at all during some of our severest winters. The probable cause is more frequently, doubtless, a short supply of food, as last winter was remarkable in this state for its mildness and for the great number of northern birds that then visited us. It has repeatedly been observed that on their first arrival these unusual visitors are generally very lean, but that they soon fatten; an argument in favor of the theory that their migration was compelled by a scarcity of food.

Probably fewer birds are actually permanently resident at a given locality than is commonly supposed, for species seen the whole year at the same locality, as the Blue Jay, the Titmouse, the Brown Creeper, and the Hairy and Downy Woodpecker, etc., in Massachusetts, are represented, not by the same, but by different sets of individuals, those seen here in summer being not those seen in winter, the species migrating north and south, *en masse*, with the change of season. We are generally cognizant of a migration in a given species only when the great "bird wave" sweeps entirely past us either to the north or south. Some species, how-

ever, seem actually fixed at all seasons, and are really essentially non-migratory, as the Spruce Partridge, and Quail (*Ortyx Virginianus*) are in New England. But only a small proportion, doubtless, of the so-called non-migratory birds at any given locality are really so.\*

In connection with this topic of migration, the fact that some of the young or immature individuals of our marine birds, as the Herring Gull (*Larus argentatus*) and other species of that family, and several of the Tringæ, linger on our coast during summer, while the adult all retire northward, is one of some interest. Mature and strong birds only, in species that breed far to the north, evidently seek very high latitudes. Birds of the first year also appear to roam less widely than the older. In different species of the Gull family it is generally only the mature birds that in winter are seen far out at sea, though in the same latitudes the young may be numerous along the coast. All observant collectors are well aware of the fact that those birds that first reach us in the spring, of whatever species, are generally not only very appreciably larger, but brighter plumaged and in every way evidently more perfect birds than those that arrive later; and that in those species that go entirely to the north of us there is a much larger proportion of paler colored and immature birds, especially among the *Sylviolidæ*, or warblers, towards the close of the migrating season than earlier. Hence the presence here of a few individuals in summer of species that usually go farther north is not always sufficient evidence that the species breeds with us.

In reference to the notes which follow, they may be considered as forming a supplement, as already stated in a foot note, to a "Catalogue of the Birds of Massachusetts" published by me five years since. In the present paper seven species†

\* In respect to the proof whereon this proposition rests, see my remarks on this point in the Memoirs of the Boston Society of Natural History, Vol. i, Pt. iv, p. 488 (foot note).

† *Strix pratineola*, *Surnia ulula*, *Turdus naevius*, *Seiurus Ludovicianus*, *Centronyx Bairdii*, *Micropalama himantopus*, *Pelecanus erythrorhynchus*.

are added to the list then given, four of which are entirely new to the fauna of the State, and the others have not before been fully established as occurring within it, though supposed to from their known general distribution. Two, the Barn Owl (*Strix pratincola*) and Varied Thrush (*Turdus naevius*), have only been previously given in Dr. Coues' Addenda to his "List of the Birds of New England."\*

The latter occurs only as a straggler from the far interior and western portions of the continent. Another now added, the Baird's Finch (*Centronyx Bairdii*), discovered by Mr. C. J. Maynard at Ipswich (see notes beyond for farther particulars), is another similar example equally remarkable, it having been previously known only from near the mouth of the Yellowstone River. A few errors in that Catalogue are also now corrected, with the design of making that and the present paper a fair exposition of the ornithological fauna of the State, so far as it is at present known. Three species† there included are now stricken out. Numerous unrecorded instances of the capture of rare specimens within the State are also chronicled, as also the breeding of a few not before positively known to breed here. There are remarks also on a few species, for obvious reasons, that are not to be regarded as among the rarer species of the State.

The whole number of species of birds now known to occur in Massachusetts is three hundred.

GERFALCON. *Falco sacer* Forster. (*F. candicans et Islandicus* Auct.) A specimen in the speckled plumage was taken near Providence, R. I., by Mr. Newton Dexter, during the winter of 1864 and 1865. Its occurrence so far south appears to be wholly accidental.

The suspicion many authors have had that the *F. candicans* and *F. Islandicus* were but birds of the same species in different states of plumage, my own examination of speci-

\*Proceedings of the Essex Institute, Vol. v, p. 312.

†Archibuteo Sancti-Johannis, Helminthophaga Swainsonii, Quiscalus major.

mens of both, in the Museum of the Boston Society of Natural History and elsewhere, has led me to believe is actually the fact. Sabine, so long ago as 1819, I think has fully shown this in his remarks on *Falco Islandicus* in his Memoir on the Birds of Greenland.\* According to the late lamented Mr. Cassin, *sacer* is the specific name which has priority for this species.†

DUCK HAWK. *Falco peregrinus* Linn. (*Falco anatum* Bon., and *F. nigriceps* Cass). I stated in my Catalogue, published five years since, that the eggs and the young of this species had been taken at different times from Mount Tom, and that the young had also been obtained from Talcott Mountain in Connecticut. A few months later I had the pleasure of giving a full account of the eyrie on Mount Tom, with a detailed description of the eggs, and some general remarks on the distribution of this interesting species in the breeding season.‡ These eggs were the first eggs of the Duck Hawk known to naturalists to have been obtained in the United States, the previous most southern locality whence they had been taken being Labrador; but the species had previously been observed in the breeding season by Dr. S. S. Haldeman as far south as Harper's Ferry, Virginia. One or more pairs of these birds have been seen about Mounts Tom and Holyoke every season since the first discovery of the eggs at the former locality in 1864. Mr. C. W. Bennett, of Holyoke, their discoverer, has since carefully watched them, and his frequent laborious searches for their nest have been well rewarded. In 1866 he took a second set of eggs, three in number, from the eyrie previously occupied. In 1867 the male bird was killed late in April, and this apparently prevented their breeding there that year, as they probably otherwise would have done. At least no nest was that

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\*Transact. London Linn. Soc., Vol. xx, p. 528.

†See Dr. Coues' List of the Birds of New England, Proceedings of the Essex Institute, Vol. v, p. 254.

‡See Proceedings Essex Institute, Vol. iv, p. 153.

year discovered. In 1868 hawks of this species were seen about the mountains, and although they reared their young there, all effort to discover their nest was ineffectual. The present year (1869) they commenced to lay in the old nesting place, but as they were robbed when but one egg had been deposited, they deserted it and chose a site still more inaccessible. Here they were equally unfortunate, for during a visit to this mountain, in company with Mr. Bennett (April 28th), we had the great pleasure of discovering their second eyrie, and from which, with considerable difficulty, three freshly laid eggs were obtained. Not discouraged by this second misfortune, they nested again, this time depositing their eggs in the old eyrie from which all except the last set of eggs have been obtained. Again they were unfortunate, Mr. Bennett removing their second set of eggs, three in number, May 23d, at which time incubation had just commenced. The birds remained about the mountain all the summer, and from the anxiety they manifested in August it appears not improbable that they laid a third time, and at this late period had unfledged young.

The first set of eggs and the female parent, collected April 19th, 1864, are in the Museum of Natural History at Springfield, as also a male killed subsequently at the same locality in April; the second set, collected in April, 1866, are in the cabinet of Mr. E. A. Samuels; the third and fourth sets, collected April 28th and May 23d, 1869, are in that of Dr. William Wood, of East Windsor Hill, Conn. Although in each set the different eggs sometimes varied considerably from each other, neither of the three last present that remarkable range of variation exhibited by the first.\* It is probable that some years more than one pair have nested on Mount Tom, but only one nest-site had been discovered before the present year. I learn from Dr. Wood that this bird is every year seen also about Talcott Mountain, and that it probably regularly breeds there. The young

\*See Proceedings of the Essex Institute, Vol. iv, p. 157.

obtained from it in 1862 Dr. Wood kept till the following fall, when they were sent to Professor Baird, and died at the Smithsonian Institution the succeeding spring. Mr. G. A. Boardman informs me that the Duck Hawk in summer keeps about the islands in the Bay of Fundy, and "breeds upon the high cliffs all along this bay.\*"

As stated by me elsewhere,† the Duck Hawks repair to Mount Tom very early in the spring, and for a month or six weeks, as Mr. Bennett informs me, carefully watch and defend their eyrie. They often manifest even more alarm at this early period when it is approached than they do later when it contains eggs or young.

SPARROW HAWK. *Falco sparverius* Linn. In reference to this species, Dr. Wood communicates the following interesting fact. "A few years since a pair of Sparrow Hawks attacked and killed a pair of doves and took possession of the dove cot and laid four eggs. Being too familiar with the farmer's chickens they were shot, and I had the good fortune to obtain two of the eggs."

GOSHAWK. *Astur atricapillus* Bon. This species varies most remarkably in the number of its representatives seen in different years, and also in the same season at localities in Southern New England not far apart. Some winters—the only season at which it is usually seen in Massachusetts—it is extremely rare, while the next it may be one of the most numerous species of its family. In years when it is generally common some of our most careful observers do not meet with it. Dr. Wood writes me, under date of October 22d, 1868, that with him "it has been a very rare winter visitor until the last winter, when they were more common than any of our rapacious birds. I mounted five specimens and sent away several for exchanges. I think twenty were shot within a radius of five miles. I have resided at East Windsor Hill twenty-one years, and have

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\* In eplst., Sept. 19, 1864.

† Proceedings of the Essex Institute, Vol. iv. p. 155.



known only three specimens taken here prior to 1867." At Springfield, less than twenty miles in a direct line north of East Windsor Hill, and at nearly the same elevation above the sea, I have known them to be quite common during several winters within the last ten years. Mr. J. G. Scott says it was common at Westfield in 1867, and not rare during the three or four winters immediately preceding. When numerous this species is very destructive to the Ruffed Grouse, which forms its principal food. In some localities they sometimes hunt them almost to extermination.

Mr. C. J. Maynard informs me that he is confident that this species sometimes breeds in Massachusetts. He says he once observed a pair at a locality in Weston until the latter part of May; after this time he had no opportunity of observing them, but he feels sure that they bred there. This is not improbable, since its usual breeding range embraces the greater part of northern New England, and probably the mountains of Western Massachusetts.

Dr. Wood mentions in his letters another interesting fact respecting this bird, which I think all careful observers are apt to notice, not only in this species but as a general fact; namely, that the birds in immature plumage are often larger than any specimens obtained in mature plumage. Dr. Wood observes, "the young are very unlike the adult both in size and markings; the young is the largest until after moulting, when the wing and tail feathers never again acquire their former dimensions. The same difference is observable in the Bald Eagle between the young and the adult."\* I have myself observed it in *Ardea herodias* and other Herons, in Thrushes, and in *Larus argentatus*, and other species of *Laridæ*. This difference in size between the adult and the young has also been reported to me by Messrs. Maynard and Bennett.

RED-SHOULDERED HAWK. *Buteo lineatus* Jard. This species was placed in the list of "Summer Visitants" instead of

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\* See also American Naturalist, October, 1869.

among the "Resident Species," as it should have been, in my Catalogue. At Springfield, I have rarely observed it in winter; but I learn from Dr. Brewer, Mr. Maynard and others, that it is in some sections of the state a quite common species at that season.

CALIFORNIA HAWK. *Buteo Cooperii* Cassin. A specimen of this species was shot in Fresh Pond woods, Cambridge, November 17, 1866, by Mr. William Brewster, of Cambridge, in whose collection it was detected a few months since by Mr. Maynard. It seems to be the first specimen yet reported from east of the Rocky Mountains. It is one of the most characteristic of the *Buteones* of this continent, and there seems to be not the slightest reason to question its capture in Cambridge.

ROUGH-LEGGED HAWK. BLACK HAWK. *Archibuteo lagopus* Gray. (*A. lagopus et Sancti-Johannis* Auct.) Generally not uncommon in winter in the Connecticut Valley.

Dr. Wood is of the opinion that the Rough-legged Hawk and the Black Hawk are the same. "I have," he says, "all shades of color from the light to the black, and I am unable to find the dividing line; both have the same measurements, the same claws and bill, the same habits, come and leave at the same time, and hunt together. I have them almost black with the faint markings of the lighter bird, showing to my mind that the lighter markings become extinct as the black increases, or as the bird increases in age. Those who claim that they are distinct say that in some localities the Rough-legs are common and no Black Hawks are to be seen. This proves nothing. The young of the Red-throated Diver are very common in Long Island Sound, yet the adult is never seen there. So it is with the Crested Grebe; the young are found here in winter — never the adult." \*

On another occasion, when writing on this point, Dr. Wood expressed his views still more strongly, as follows: "The Rough-legged Falcon and Black Hawk are the same. I have

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\*In epist. Oct. 22, 1868.

taken and examined, I presume, forty specimens. *They are the same bird*, but not of the same age. The black is the adult. . . . The differences in markings between them are not as great as in many birds, as, for example, in the Bald Eagle, the Golden Eye, Sheldrake, etc. I have taken them from those with the lightest markings to jet black, with all the intermediate varieties in color. So gradually do they become more and more black till jet black is reached, that I will defy any one to draw the separating line. It would be as difficult as to tell when the 'pig becomes a hog.'\*\*

The late Mr. Lucius Clarke, of Northampton, I have been informed, had a similar series, and that from an examination of a large number of specimens he had arrived at the same conclusion. I have not yet had an opportunity of comparing a very large number, but from a study of those I have seen, and of the accounts given by authors, I believe the view taken by Dr. Wood and Mr. Clark to be the correct one.

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## TROUT FISHING IN THE YOSEMITE VALLEY.

BY HON. J. D. CATON.

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By far the hardest day's work the tourist has in "doing" the wonderful valley is the visit to the Vernal and the Nevada falls, where the Merced River makes a clear leap of three hundred feet over the first, and seven hundred feet over the second. Our guide, Mr. Cunningham, assured me that not a fish of any kind is found in the river, or any of its tributaries above the first or lower fall. Below these falls several varieties occur, the most interesting and the most abundant of which is the Speckled Trout (*Salmo iridea* Gib.). It differs materially from its cousin, the Speckled Trout of the Eastern States (*Salmo fontinalis*), especially in habit and

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\* In epist. Sept. 5, 1864.

coloring, and is more sluggish in movement and less voracious in appetite. Its spots are all black, less regular in size, form and arrangement, and it has a coppery stripe running along the lower part of either side. It was the unanimous verdict of our party that its flesh is inferior to that of the eastern brook trout, though it was highly relished by all. The waters of the river are almost as transparent as the atmosphere, and are as cold as it is safe to bathe in. The trout were so abundant that usually several were in view to the observer standing on the river bank, but so shy that one would rarely remain within forty feet.\* The Indians daily brought in large strings taken with the hook, which they sold to Mr. Hutchings, our landlord; but it was said, that with one exception, no white man had ever taken one. The bait always used by the natives is the angle-worm, which Mr. Hutchings assured me was found abundant in the valley by the first white visitors. I may pause here to say that this statement interested me much from the fact that none of these worms were ever found on Lake Superior till they were planted there; ten years ago those who used them for bait were obliged to take them along. I planted the first at Eagle River, seven years since, with worms taken from Ottawa, Illinois, and they have flourished finely since.

After nine hours of travel on a very hot day, we returned from viewing the falls to the hotel. While the rest of the party sought rest on beds in their rooms, or on robes or blankets under the oaks, I determined to try my hand with the trout. I overhauled my satchel and found a few flies and some naked hooks, and a very indifferent line. Mine host loaned me a Chinese rod, which answered well enough. I first essayed with artificial flies, from behind a bunch of willows, by which I was entirely concealed. They simply laughed at all my efforts at deception. They seemed as indifferent to any fly which I had as they would

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\*They were generally observed moving slowly about from six to twelve inches below the surface. The current is very strong.

be to a willow leaf. I stopped fishing, and observed them for nearly an hour from my concealment. They were constantly rising to the surface for something floating on the water, though not with the dash and *vim* of an eastern trout, but with a staid and dignified pace which seemed to say they were quite indifferent whether they caught their victims or not. It was clear then that with a proper fly and the laziest possible mode of handling it would persuade them. I now resorted to the angle-worms.\* I fished in deep water and in shallow, in the rapids and in the eddies, with every mode and motion I had ever found successful with trout. It was of no use. Sometimes one would approach in a sluggish way and smell of the bait, but would never touch it. I then tried them as if fishing for black bass, but with no better success,† and in that deep gorge hemmed in by vertical walls four thousand feet high, it already seemed as if night was upon me. Still as the Indians often take them in the night with the same bait, I thought I would try another mode. I went at them now as if I were fishing for black pike in the Illinois or Fox River. I threw the bait into the swift current well above me and allowed it to float till it grounded as far down the stream as the line would allow. Here it was allowed to remain for perhaps five seconds, and then with a moderate but steady motion it was brought up stream and towards the surface. The secret was solved. It had not been raised from the bottom more than a foot, when it was met by a trout about twelve inches long, but I did not make sufficient allowance for his sluggish habits, and struck before he had well taken the hook, and he fell back into the water close by the bank. Several succeeding casts were unsuccessful. Soon, however, a stranger came along, and was deceived by my unprofessional practices, and took the bait as it was rising from the bottom in a way that seemed

\*With which a juvenile "Lo." had supplied me for a dime.

†The last rays of the setting sun had ceased to play on the smooth face of South Dome which towered above me almost a mile in altitude.

to say, "I don't much care whether you escape me or not." I however gave him plenty of time and then landed him. If I had been too quick with the first, I was too slow with this, for the hook had quite disappeared, so that a knife was necessary to disengage it, and my prize was so much disfigured as to spoil it for a specimen. It was now nearly dark, and without another cast I hastened home, where I found my party busily engaged discussing a comfortable dinner. Senator H. suspended his gastronomic occupation and carefully examined my prize, and then deliberately surveyed the captor, and at last profoundly remarked, "this should be considered no exception to the rule of this valley that the trout will not bite a white man's hook. The fish should be pardoned, for the mistake was most natural." And then the whole party, with a spirit only known in a jovial excursion party determined to make the most of every incident, struck up "so say we all of us." I forgave the ladies at least, for nearly all had excellent voices and were always ready to use them on the least provocation; but I yet owe the senator *one*.

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### THE ESQUIMAUX DOG.

BY H. M. BANNISTER.

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THE study of the domestic animals of a barbarous nation or tribe is chiefly interesting as throwing some additional light upon their physical and intellectual status, and is therefore a fit adjunct to the study of their ethnological and historical relations. When, however, the species are, as it were, unique in this capacity, or when through domestication any very remarkable variation from the usual type appears to have been produced, they then become of more general interest. Under this latter class we may place the

Esquimaux Dog; and, although it may require more of faith in the Darwinian hypothesis than every one feels obliged to possess, to acknowledge it as a distinct species from the "curs of low degree" which infest our civilization, no one will fail to concede that it is a sufficiently well marked variety. Being thus remarkable, it has received more or less notice from nearly every voyager on the more northern coasts of our continent; and notwithstanding that the subject is therefore not entirely new, I venture to add a few observations of my own, made during a residence of about a year on the coasts of Alaska, near Behring's Straits.

There is no necessity of going into detail as to the general appearance of our subject, in this place, as descriptions are sufficiently numerous and accessible in works of travel, cyclopedias, etc., the habits and peculiarities in other respects, affording sufficient grounds for remarks. Suffice it merely to say, that with his heavy, but even coat of hair filling up and rounding off the hollows and angles of his body, his bushy tail curling over his back, erect ears, and the generally intelligent expression of countenance, the Esquimaux Dog may be called a rather handsome animal. The average size appears to me to have been overestimated in some of the descriptions, although the breed may attain larger dimensions in other regions than that in which I observed it. A few individuals were seen which approached or equalled in size the Newfoundland dog, but by far the greater number were decidedly smaller, some appearing even diminutive in comparison; still, however, preserving all the characteristic marks of the variety. In color they vary from white to black through the different shades of gray and brown, a very large proportion being piebald. Some of these variations in size and color may perhaps be owing to a slight admixture of foreign blood, as there are among the Alaska Esquimaux a large number of mongrels, with the Indian dogs of the interior, the Siberian dogs introduced by the Russians, and doubtless with various forms of the dogs

of civilization, even down to the familiar "yellow dog," of which variety one or two quite typical specimens were seen during my stay in the country; in these instances, most probably introduced by whalers. The Siberian dogs themselves, as seen in Kamtchatka are not always very different from the Esquimaux type, and the dogs of the sedentary Tchuktchi, or Asiatic Esquimaux, are, if not the same as those of the American coast, a very nearly allied variety. From the regular traffic which has been carried on from time immemorial across the straits, we may infer that a very considerable mixture has been made between the dogs of the two continents. The natives frequently take their dogs with them in their summer trips by water; and a full loaded oomiak under sail, with its lading rising a foot or so above the gunwale amidships, and kept from falling overboard by sticks stuck up on each side, one or two kayaks carried athwartships over all, or towing astern, and with its full complement of male Innuits, squaws, papooses and dogs, is rather astonishing to one's preconceived ideas of Esquimaux navigation.

The external coating of long hair is underlaid in the Esquimaux dog by a denser mat of closely interwoven fibres, which, though coarse, seem to have sufficient length and toughness to allow of its being spun out into thread. I have seen, indeed, a blanket, brought from the Mackenzie's River District of the Hudson Bay Territory, which was said to have been woven from dog's hair, probably of this, or a closely related variety, the Hare Indian dog. In the summer time this wool may be easily pulled off in large patches provided the animal is kind enough to allow the handling, which is not invariably the case. This, with the dense covering of shorter hairs on their legs and feet, appears to make them indifferent to almost any degree of cold, as they frequently and habitually pass the bitterest nights and fiercest storms of the arctic winter, with no other shelter than is afforded by the lee side of a native hut, and sometimes without even that. Nor do other apparent sources of dis-



comfort appear to trouble them much. I remember seeing at St. Michael's, during one of the coldest days of December, one of the Fort dogs comfortably asleep on the steps leading to the door of a store-house, with his hinder quarters at the top, and his head near the bottom, his whole body some twenty or thirty degrees out of the horizontal. Another advantage of their heavy outer covering, and not an inconsiderable one, is that it enables them the better to undergo the disciplinary ordeal of the whip, enough in some instances, it would seem, to make raw hide thongs of an ordinary dog skin.

The Esquimaux dog does not bark, and this, together with the short quick snap of his bite, is the most wolfish trait which he retains from his supposed ancestry. There is, however, no lack of voice, or the exercise of it; he howls most dismally whenever the spirit moves him. Those who have had experiences of wolves and coyotes on the plains, can form but a faint idea of what it is to have two or three dozen Esquimaux dogs howling in concert within a few feet of one's head. The noise will go through two or three log partitions, and then be altogether trying to human nerves. There are times, nevertheless, when it is rather comical than otherwise; as, for instance, when they exert themselves in this direction in starting on a journey. As soon as the sled is brought out, and while the load is being adjusted upon it, the dogs gather around, and, fairly dancing with excitement, raise their voices in about a dozen unmelodious strains. There are often one or two who have to be dragged up to their duty by a whip-lash around their necks, and they add their peculiarly lugubrious, half strangled notes to the general discord. This kind of row is renewed every time they start, until travel and hard work have taken the spirit out of them, when they go to their work in a dogged, business-like manner without any particular uproar.

From five to seven dogs are generally used together in a team, though the poorer natives often make shift to get along

with a less number, a single dog being sometimes made to do duty alone. On the other hand the Russian traders, and more rarely the Esquimaux, occasionally put eight and nine dogs in a single team. The pups, as soon as they are able to travel, are fastened up with the older dogs, and learn their business very rapidly. Once in a while one breaks down on a journey, and is then often inhumanly abandoned where he drops; but they generally get along marvellously well, allowing for their tender age.

The Alaskan Esquimaux sled is a rather heavy looking affair, nine or ten feet in length by about two in breadth, with thick, strong runners, often shod with pieces of solid whalebone. To the front of this is attached a strong raw-hide thong or rope, eleven or twelve feet in length, to which the dogs are fastened by a simple harness, consisting in its most elaborate form, of a breast band and another strip passing over the back, and underneath the dog immediately behind his fore legs. The continuations of the breast band, passing backward on each side, join over the back, and from this junction is continued a short trace, by which the dog is fastened to the above mentioned rope, usually in equal numbers on each side, and one at the end. By this arrangement a great deal of the strength of the dog is wasted in side draft; notwithstanding this, it is probably the best that can be made, since it allows of no such irremediable snarling of the lines as would inevitably result were any more complicated arrangement adopted. A team of dogs will frequently stop when under full headway to engage in a general fight; and on being brought to order by an energetic use of the whip, both lash and stock, will jump to their places and proceed as before, without any confusion or entanglement whatever.

The amount of load carried on these sleds varies of course with the number and condition of the animals, but perhaps seventy-five pounds to a dog is a little above, rather than below the average. The greatest feat of this sort which came

under my observation was performed by one of the fort teams of eight dogs, all, with perhaps one exception, of pure Esquimaux breed, but the finest of their class, several of them fully equalling in size a Newfoundlander. They travelled about forty miles in a single day, part of the distance through freshly fallen and drifted snow, drawing, on one of the before mentioned heavy native sleds, nearly eight hundred pounds of reindeer meat; the whole, with the sled, probably approaching a thousand pounds in weight. I never heard of any team of Esquimaux dogs excelling this, but was informed by the late Major Kennicott that the Hudson Bay Company traders with a peculiar breed of introduced dogs, somewhat resembling the Danish mastiff, load their light sleds with an average allowance of about one hundred pounds to each dog.

The art of guiding the team by the whip and voice appears to be almost unknown among the Alaskan Esquimaux; it is customary with them to keep a man running ahead of the sled to show the way, the dogs following him instinctively. When, however, the route has been often travelled over before by the same team, or when there is a previously made sled track for the dogs to follow, the runner is sometimes dispensed with. In the sled teams of the Russian traders, and not so invariably in those of the natives, the leading dog is always the same, and often becomes so habituated and attached to this position, that he will resent being put in any other place in the team. These leaders are generally selected for their willingness to work; pluck and sagacity also being considered. Strength and size, though valuable in this position, are of secondary importance; a small plucky dog will sometimes achieve and hold this preëminence by sheer moral force, and a first-class leader holds it in his ordinary intercourse with the other dogs as well as when fastened up with them in harness. Much is trusted to the sagacity of a good leader, in the way of picking out the route, avoiding obstacles, etc. In fol-

lowing a previously made sled track he does not always follow it blindly, but will frequently cut across short turns and show a considerable exercise of judgment in other ways. In the winter of 1865-'66, a small party of Russian traders and Esquimaux employees, some half a dozen persons altogether, while travelling with dogs and sleds, between the mouth of the Yukon River and Fort St. Michael's, on Norton Sound, were caught in a very severe snow-storm near the southern point of St. Michael's Island, a flat marshy region, very much intersected by water channels winding in every direction. The driving snow completely obscured all the landmarks, and the early nightfall of these latitudes coming on about the same time, they became confused and lost their way entirely. Having in the party no compass or other means of directing their course, their only recourse was to call in the runner and trust to the intelligence of one of the leaders, an old dog which had been tried in similar emergencies and had not been found wanting, to bring them out of their peril. The plan succeeded; and under his guidance they arrived safely at their destination, a result which they all admitted could hardly have happened had they been left to their own direction. I give this story on the authority of the members of the party; the dog in question was unanimously praised for his knowingness. I can myself testify to his general sagacity. If his finding the way must be accounted for, I should attribute it to his previous knowledge of the country, rather than to instinct or power of scent, which does not appear to be very remarkably developed in this variety.

Most travellers have mentioned the voracity of these dogs in times of general scarcity. There appears then to be no limit to their appetite; nothing is safe from them; they will devour old boots, rawhide ropes, and have even been known to tear up and swallow cotton cloth and old rags. The dogs belonging to the natives undergo such periods of starvation pretty regularly, and many succumb nearly every

winter to the combined effects of want of food and hard work. There is also an epidemic disease which is very destructive some years, and is undoubtedly the same as that described by Dr. Hayes as occurring amongst his dogs on Smith's Sound during the winter of 1860-'61. As in the cases related by him, the symptoms closely resembled those of hydrophobia, but the disease does not appear to be so communicable by the bite. There seems also to be some connection between the disease and the nature and quantity of the food, as it was mostly confined in its ravages during the winter of 1865-'66 to the poorly and irregularly fed dogs of the natives, while the better cared for animals of the Russian traders suffered in a much less proportion. Genuine hydrophobia does sometimes occur; a most unmistakable case of it was observed during the summer of 1866.

During the summer months, from May to September, the dogs are fed only irregularly by most of their owners, and are sometimes left entirely to themselves to find their own living. In spite of this they usually manage to grow fat during this season, and to make up all they have lost in strength and substance during the winter. They supply themselves with fresh game, not only the smaller quadrupeds and grouse, but also occasionally running down a deer. Their hunting instincts are so strongly developed, that while travelling in the winter, if a reindeer or even a fox or rabbit is in sight, it is quite difficult to keep any control over the dogs, and the mere utterance of the word *tung tuk* (Esquimaux for reindeer) is often effectual to enliven a lagging team. Many dogs wander off after deer in the summer and are lost to their owners; and as comparatively few stray dogs are picked up, it appears that the greater number of these either revert to the wild state, or are destroyed by wolves and other beasts of prey. Wolves sometimes attack and carry off dogs from trading posts and villages. In the spring of 1866, a wolf attacked some twenty or thirty dogs just outside of the stockade at St. Michael's. The uproar

brought the whole force of workmen to the rescue, otherwise he would certainly have made way with one or more; for Esquimaux dogs in almost any number, are no match for a northern wolf.

Of the other breeds of dogs which are used as draught animals in the north, I have already mentioned the large dogs of the Hudson Bay Company's traders, which are known to me only by description. The Indian dogs appear, for the most part, like a very degraded variety derived from the wolf. A peculiar variety, of unknown origin, but probably from Europe or Siberia, was used to some extent by the Russians. In appearance it resembles the shepherd dog, but stands as high as a Newfoundlander. Its shape is slenderer than that of the native breed, and the hair is shorter, the colors are usually black or dark brown and white or tan, with a yellow spot over each eye, as in some of the terriers. They appear to be quite as hardy and serviceable as the native variety. I have known a team composed chiefly of dogs of this breed to travel with a light load over a well marked track, between sixty and seventy miles in a single day.

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## OUR COMMON FRESH-WATER SHELLS.

BY E. S. MORSE.

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IN this and a few succeeding papers we intend to give a brief outline of several groups of fresh-water mollusks common to the United States.

The intention is to make them useful to the young collector in enabling him to determine the generic names of the more common shells he may have in his collections, and to give him some idea of their habits and structure. He will also become acquainted with the specific names of the more common shells he meets with. Nothing more than a brief

Fig. 2.



Fig. 1.

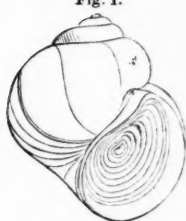


Fig. 3.

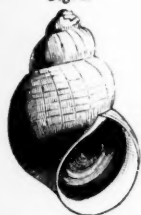


Fig. 6.



Fig. 4.



Fig. 9.



Fig. 8.



Fig. 5.



Fig. 7.



Fig. 10.



Fig. 11.



Fig. 12.



Fig. 13.



Fig. 14.



Fig. 15.



Fig. 16.



Fig. 18.



Fig. 17.



Fig. 20.



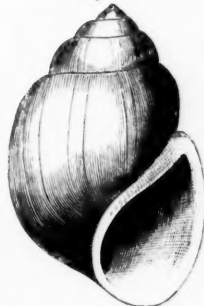
Fig. 22.



Fig. 21.



Fig. 19.



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sketch will be attempted. In one sense the papers will be a compilation from the treatises of Prime, Binney, Bland, and others, published by the Smithsonian Institution, through whose liberality we are enabled to illustrate this and the papers which are to follow.

A shell common in most of the streams and ponds of New England, a figure of which is here given, Fig. 78, belongs to a group of mollusks that is distributed throughout the northern hemisphere. They are usually found in muddy streams or ponds, either grovelling an inch or so in the mud or among roots, or crawling along over the sand.

The creeping disk is quite long and broad. The little snout, on each side of which may be seen the tentacles, with eyes at their bases, projects beyond the margin of the shell in front, while behind the shell, and attached to the upper part of the tail may be seen a semi-circular corneous plate called the operculum, Fig. 79. In Pl. 9, fig. 2, another species is represented in the attitude of crawling, showing the position of the operculum. When the animal retires within its shell the head and forward part of the foot disappears first, followed by the tail with the operculum, which

answers as a lid, or door to close the aperture of the shell. In Figs. 1 and 3 of the plate, the appearance of the operculum is shown within the aperture of the shell. As the shell increases in size, by the addition of tiny particles around the margin of the aperture, the operculum increases likewise by the addition of the corneous substance around its margin, and the little concentric furrows seen in the figure of the operculum indicate its successive rates of increase. Most marine Gasteropods (the name of the class to which all those mollusks belong that have a broad creeping disk) are furnished

Fig. 78.



Fig. 79.



with opercula, though they vary greatly in composition and shape. Some are strengthened by the addition of lime, and are quite solid; of this kind is the eye tone, so called; some are claw-shaped, circular, or very irregular in form. In most species the operculum fits the aperture of the shell very closely; in others the operculum is rudimentary. In *Strombus*, or the conch-shell, it is long and sharp, projecting some way beyond that portion of the foot to which it is attached, and the animal uses it by thrusting it into the sand, and then by a quick muscular contraction throwing its whole body forward. While most mollusks lay eggs, some in a glairy mass, as in the air-breathing water snails, or in a series of pods like the whelk, the group of which we are now treating, bring forth the young alive, but the young are simply hatched from the egg, before the egg leaves the parent; hence they are called ovoviviparous. On breaking open the shell of a female in spring time, the young ones may be found of various sizes within their globular eggs.

The species figured above, and also in Pl. 9, fig. 11, is now known as *Melantho decisa*, and is the only species found in New England. The shell is quite solid, having four or five whorls; though the first two whorls, forming the tip of the shell, is always absent from erosion. In young specimens a perfect one may be found; but adult shells are always imperfect, as shown in the figure. The color of the shell varies in being a light or dark green, and shiny. Within the aperture the shell is bluish white.

Those who have the first volume of this magazine will recall the description there given of the tongue of a land snail, in which it was stated that the floor of the snail's mouth was lined by a membrane covered with many rows of minute spurs, or teeth, and that the snail used this tongue in rasping its food. Now these minute teeth furnish admirable characters in the classification of these minor groups of mollusks. Thus the air breathing snails which have no operculum have the tongue lined with rows of very nu-

merous teeth; while those air breathing snails which have an operculum usually have a long slender tongue and have only seven teeth in a row, and in this feature they resemble the group now under consideration. Fig. 80 represents one row of teeth taken from *Melantho decisa*. This species contains about forty rows of teeth, and as these teeth always hook backward they act admirably as a rasp in licking up their food. The members of this family found in the United States represent four well marked genera containing about twenty species.

The two principal ones are *Vivipara* and *Melantho*. In *Vivipara* the shell is generally thinner, more globose, the lingual teeth are always strongly notched; see Fig. 81. (Compare this with the teeth of *Melantho decisa*, Fig. 80). The disk of the animal does not project beyond the snout. See Plate 9, fig. 2. It will be noticed that there are two distinct folds, one on each side of the aperture of the shell, and these form regular conduits for the water to enter and bathe the gills for respiration; the water entering by the right opening, and finding egress by the left one.

(See Plate 9, fig. 4).

In *Melantho* the shell is not so globose, but is more solid, and the lingual teeth are smooth, or only slightly serrated.

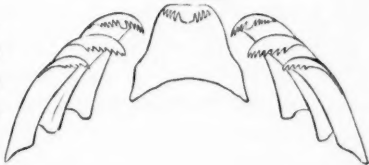
The foot also projects far beyond the snout, as in the figure of *Melantho decisa*, and the folds which conduct the water to the gills do not form regular tubular conduits as in *Vivipara*. We will now mention briefly the more prominent species, figures of which will be found in the plate.

*Vivipara intertexta* Say, Plate 9, figs. 2, 3, 4, has a very globose shell, yellowish green or brownish horn color, having numerous nearly obsolete revolving lines. The species has been found in Louisiana, South Carolina and Iowa. *Vi-*

Fig. 80.



Fig. 81.

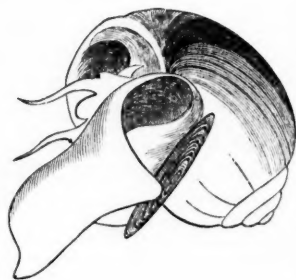


*vipara subpurpura* Say, Plate 9, fig. 8, has an oblong, subovate shell, olivaceous in color, with a tinge of purple. Figs. 9 and 10 represent younger specimens. Mr. Binney says he has traced this species from Texas through Louisiana and Mississippi to Key West, Fla., and in the Western States of Indiana, Wisconsin, and Missouri.

*V. contectoides* W. G. Binney, Pl. 9, figs. 5, adult; 6 and 7, young. The shell of this species is ornamented with four revolving bands, is quite smooth and shiny, and the umbilicus is open. The shell closely resembles a common European species. Found in nearly all the Southern and Western States.

*Vivipara Georgiana* Lea, Plate 9, figs. 1 and 15, operculum. This species inhabits Florida, Georgia, South Carolina and Alabama.

Fig. 82.



There are other species of this genus in the United States, but it was our intention to mention only those that were more characteristic.

Of *Melantho* we have several well marked species, among which *Melantho ponderosa* Say (Plate 9, figs. 14 and 16, young; figs. 19 and 20, adult),

is the largest. It is a heavy solid shell an inch and a half in length, greenish horn color. It has been found in Ohio, Indiana, Illinois, Michigan, Tennessee and Alabama. Fig. 82 shows the shell with the animal extended. The creeping disk is bent upon itself. The operculum may be seen on the hinder portion of the body, and the tentacles and eyes are seen near the aperture of the shell.

*Melantho decisa* Say, Plate 9, fig. 11, represents the species common to the New England States. Some specimens are very smooth and bright green in color. They are all devoid of an apex, and this is a characteristic feature. Sometimes the shell is found reversed; that is, the spire twists the other way.

*Melantho integra* Say, Plate 9, figs. 17, 18, 21 and 22. This shell is abundant in the Western States. Mr. Binney is inclined, from an examination of a large number of specimens, to believe that it is the same species as the one just mentioned, and he may be right, but the weight of authority is against him. The differences between the male shell, Fig. 22, and the female shell, Fig. 21, are quite marked.

*Melantho coarctata* Lea, Plate 9, figs. 12 and 13, occurs in South Carolina, Alabama, Mississippi and Arkansas. There are other species of this genus in the United States, but it was our intention to enumerate only the more prominent species of each genus presented. It would be of the highest interest for the collector to diligently seek for specimens of this group from all localities, and compare them to see where the lines may be drawn between the species. We suggest this, since there is so much variance of opinion between writers on this subject. Mr. Binney to whom we are much indebted for the work which has been so generously published by the Smithsonian Institution, has brought together a vast amount of material, and while he may have been too conservative, we prefer this, to the lamentable practice of many, in describing from a single specimen. In the specimens mentioned above we have relied on the accuracy of the figures in identifying the species, and for this reason the descriptions are either brief or wholly wanting.

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## THE VIRGINIA PARTRIDGE.

BY AUGUSTUS FOWLER.

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THE *Ortyx Virginianus* is a resident bird, and was more common in former years than at the present time. Thirty years ago a covey of from five to thirty of them could be flushed on almost any farm in Essex County. Now one of

them is seldom met with. It is not in the clearing away of our forest and the cultivation of the land, nor the increase of population, that makes the decline in their numbers, for they are birds whose habits do not lead them to the retirement of the deep forest, but rather to the cultivated fields, to small patches of woodland, and to bushy pastures; in fact, in winter they not unfrequently visit the hay and corn rick and barnyard of the farmer, and are sometimes so familiar as to come from the fields and feed with his poultry. The great inducement which leads to the destruction of the Partridge is the delicious flavor of its flesh; and the most common modes used to take them, are traps that secure a whole covey at one time. Many of them are taken by means of the gun; not so many fall by it, however, as are captured by the snare or trap; although a good gunner can secure a flock if he selects the right kind of a day, in the right season of the year. The best season to hunt the Partridge is in the winter, on a snowy day; and the faster it snows the more sure is he of success and of good sport. On such days the birds usually leave the more open lands and resort to sheltered situations, such as small pine woodlands, if any such are in their vicinity. The sportsman enters the woods. Not a sound is heard. The fall of his footsteps are as silent as the fall of the snow around him; no rustling of leaves, or the crackling of dried sticks beneath his feet is heard to disturb the stillness. He walks silently on, with his mind prepared for a surprise shot; as yet the silence prevails, when, sudden as thought, up rise before him a covey of Partridges on loud whirring wings, and fly in different directions; he selects the one which flies directly before him and fires; by being prepared, and not excited by the sudden springing of the birds, he brings her down. Although they separate when flushed, they are gregarious and are fond of each other's company; and when they are thus separated, their well known call-note is sounded for a reunion.

The hunter stands in his tracks, and soon hears the notes

of one sounding loud and clear through the snowy air, and immediately directs his steps to the spot from where the sound came; after advancing a short distance, he stops and waits to hear the call-note again; soon it is heard louder than before; he now proceeds with certainty, and sees the bird perched on a rotten branch, beneath the snow-bent limb of a pine tree, and cautiously getting within range of him, he fires; having reloaded his gun he hears another bird in a different part of the woods; this one he may find on the ground near the roots of a tree, whose wide spreading branches and thick foliage bear many snows. He may proceed in like manner until he has secured them all. Such a day's sport, as a sportsman could have a few years ago, is now of rare occurrence; he may enter the coppice or small woodland and find the stillness there, but will not see the whirring game springing before him, nor hear their loud, shrill, clear whistle. I know that many flocks of the Partridge succumb to the rigors of our northern winters; roosting as they do on the ground, they seek some sheltered spot from the coming storm, such as the lea of a bunch of gray birches, barberry bushes, or ferns, and if the snow comes deep and heavy, or a crust forms upon its surface in the night, they are sure to die. They have not the energy and strength to extricate themselves from their situation, and in spring their remains, such as the feathers and bones of a whole covey, are found in such places. But the greatest cause for their decrease is capturing them in nets, when whole flocks of them are taken at a time; and, unless laws are enacted, and at once enforced, for their preservation, not only for the Partridge but for all the game birds throughout the country, we shall have cause to regret our delay in not suppressing the indiscriminate slaughter that is now carried on among them. The male Partridge has not the proud mien of the Ruffed Grouse, but his step is stately and his manners in the breeding season resemble those of the domestic cock. The female usually retires by herself, and is

seldom, though sometimes, accompanied by the male, and selects the spot for her nest, which is under a tuft of grass, or a bush, or something that affords both shelter and concealment, and makes it of dried grass or of such material as lies about the spot, and then lays from fifteen to twenty pure white eggs, which measure one and four-sixteenths of an inch in length, by fifteen-sixteenths of an inch in breadth; they are very pointed at the smaller end, and are put in such nice order within the nest that if taken out it is difficult to place them as they previously were. The young leave the nest soon after they are hatched, and follow their mother, who shows great anxiety for their welfare and will defend them when in danger at the cost of her life. When surprised with her brood she makes use of the same artifices with the Grouse and other birds which build upon the ground; at such times she will flutter along on the ground in the greatest disorder only a few feet in advance of a dog, and yet elude every attempt he may make to seize her, until she has led him a sufficient distance from her young ones, and then rising in the air by a circuitous route returns to them. I was once passing over a cart path that led between a woodland and a field from which barley had been lately harvested, and saw an old Partridge coming through the stubble with her numerous family towards the woods. I stopped to let them pass before me, and I soon saw by her movements that I was not discovered by her, and concealed myself as well as I could. As they approached the young ones were heard to call incessantly for their mother to stop and cover them. After she had cleared the stubble, she stood a moment upon one foot in the hard beaten track, and looked earnestly about, and apprehending no danger, she partly squatted down, and as the young emerged from the damp grass, with wet legs and thighs, they eagerly sought the warmth of her body by crowding under it, and although they were young and small, they jostled her considerably until they became settled. After brooding them for a time she led them into the woods.



Friendless bird! How is it possible for her to rear such a numerous family, when surrounded by so many enemies. Not only does man contrive many schemes to entrap them, but many of the rapacious quadrupeds and birds are ever ready to make them their prey. The mink follows them in the woods with as unerring skill as does the setter dog, while the red-tailed hawk hunts them in more open ground.

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## THE GREAT AUK.

BY PROFESSOR JAMES ORTON.

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THE recent addition of a specimen of this rare bird to the Smithsonian Museum, is an event worthy of record. There are now three specimens in the United States; the one just mentioned, another in the Academy of Natural Sciences, Philadelphia, and a third in the Giraud Cabinet in Vassar College. The last is the most perfect specimen, and certainly possesses the greatest historical value, as it is the one from which Audubon made his drawing and description. It was caught on the banks of Newfoundland.

The Great Auk or Gare-fowl,\* fortunately for itself did not live long enough to receive more than one scientific name—*Alca impennis*. It was about the size of a goose, with a large head, a curved, grooved and laterally flattened bill; wings rudimental, adapted to swimming only, approaching in this respect the penguins of the southern hemisphere. The toes are fully webbed, the hind one wanting; the plumage is black, excepting the under parts, the tips of the wings, and an oval spot in front of each eye, which are white. It was an arctic bird, dwelling chiefly in

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\*Buffon called it *Le Grand Pengouin*. Moebring adds the tribal name *Chenalopec* (fox goose) to distinguish it from the rest of the Alcidae.

the Faroe Islands, Iceland, Greenland, and Newfoundland.\* "Degraded as it were from the feathered rank (said Nuttall), and almost numbered with the amphibious monsters of the deep, the Auk seems condemned to dwell alone in those desolate and forsaken regions of the earth." But it was an unrivalled diver, and swam with great velocity. One chased by Mr. Bullock among the Northern Isles, left a six-oared boat far behind. It was undoubtedly a match for the Oxfords. It was finally shot, however, and is now in the British Museum. "It is observed by seamen," wrote Buffon a hundred years ago, "that it is never seen out of soundings, so that its appearance serves as an infallible direction to the land." It fed on fishes and marine plants, and laid either in the clefts of the rocks or in deep burrows a solitary egg, five inches long, with curious markings, resembling Chinese characters. The only noise it was known to utter was a gurgling sound. Once very abundant on both shores of the North Atlantic, it is now believed to be entirely extinct, none having been seen or heard of alive since 1844, when two were taken near Iceland.†

The death of a species is a more remarkable event than the end of an imperial dynasty. In the words of Darwin, "no fact in the long history of the world is so startling as the wide and repeated extermination of its inhabitants." What an epoch will that moment be when the last man shall give up the ghost! The upheaval or subsidence of strata, the encroachments of other animals, and climatal revolutions—by which of these great causes of extinction now slowly but

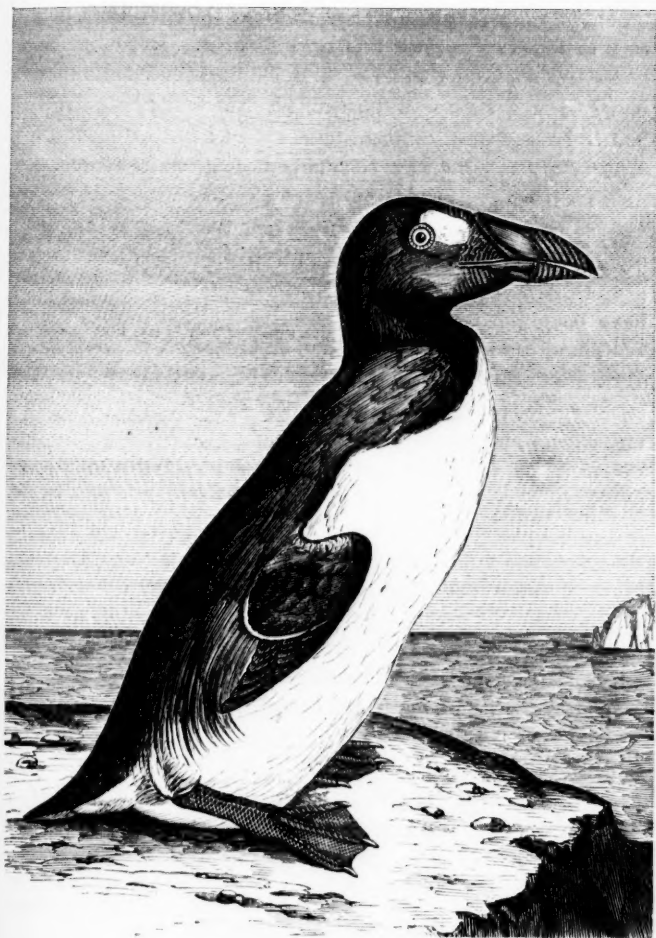
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\* Audubon records the statement that formerly "Penguins were plentiful about Nahant and some other islands in the bay." But the old gunner, who gave him the information, must have meant the Razor-billed Auk.

[That the Great Auk was once very abundant on our New England shores, is proved beyond a doubt by the large number of its bones that have been found in the ancient "Shellheaps" scattered along the coast from British America to Massachusetts. The "old hunter" who told Audubon of its having been found at Nahant, was undoubtedly correct in his statement, as we have bones of the species taken from the Shellheaps of Marblehead, Eagle Hill in Ipswich, and Plum Island, and Mr. Elliot Cabot has informed me that an old fisherman living in Ipswich described a bird to him, that was captured by his father in Ipswich many years ago, which, from the description, Mr. Cabot was convinced was a specimen of the Great Auk.—F. W. P.]

† Owen makes this singular mistake: "The Great Auk existed in the last century; no specimen has been obtained in the present."

Fig. 83.



The GREAT AUK, *Alca impennis* Linnaeus.

Copied from Audubon, Plate 465.

incessantly at work in the organic world, the Great Auk departed this life, we cannot say. We know of no changes on our northern coast sufficient to affect the conditions necessary to the existence of this oceanic bird. It has not been hunted down like the Dodo and Dinornis. The numerous bones on the shores of Greenland, Newfoundland, Iceland and Norway, attest its former abundance; but within the last century it has gradually become more and more scarce, and finally extinct. There is no better physical reason why some species perish than why man does not live forever. We can only say with Buffon, "it died out because time fought against it." From the *Lingula prima* to the Auk, genera have been constantly losing species, and species varieties; types and links are disappearing.

Still more mysterious than the extirpation of species, but equally interesting, is their coming into being. We must not expect this event to be conspicuous. We suppose that the ushering in of the puny sloth was as quietly and inappreciably done as the annihilation of its gigantic prototype, the Megatherium. We are rather compelled to believe in the continual formation of "incipient species" to take the place of those that have expired. But how? By transmutation or special creation? We will not decide; but we must hold to one or the other, or else believe there are far fewer species now than when man was added to the world's fauna. For how many animals which figure in Pleistocene strata are missing in the Recent Life! "That a renovating force, which has been in full operation for millions of years, should cease to act while the causes of extinction are still in full activity or even intensified by the occasion of man's destroying power, seems to me in the highest degree improbable."\*

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\* Lyell's *Antiquity of Man*, p. 394.

## REVIEWS.

HUXLEY'S CLASSIFICATION OF ANIMALS.\*—This is not a new work, but a republication, without revision, of the six lectures on the classification of animals, which form the first part of Professor Huxley's "Lectures on the Elements of Comparative Anatomy," published in 1864. It is perhaps the most compact, clearly written and modern text book of zoölogy, from the side of comparative anatomy, that is in the market, and we recommend it for study to be consulted with Agassiz and Gould's Principles of Zoölogy, and Milne-Edwards' Zoölogy. A large number of the admirable wood-cuts are original, the book is beautifully printed, and to us the perusal of the work has been a great treat. The author's style is clear and terse, and the writer, withal, so frank and outspoken, that we feel strongly the personality of his clear headed, sturdy intellect, though less far reaching and penetrative often, than clear sighted and decisive.

The author first gives the characters of the twenty-seven classes of animals recognized by him, which occupies one-half of the book. In a succeeding chapter he discusses their arrangement into larger groups, namely, the subkingdoms [branches, or types]. The branch of Vertebrates is retained as Cuvier left it. As regards the branch of Articulates, the author is disposed to break it up into two branches, *i.e.*, the ANNULOSEA (Insecta, Myriapoda, Arachnida, Crustacea, and the Annelida); and the ANNULOIDA (Echinodermata and Scolecida). Cuvier's branch of Mollusca is subdivided into the MOLLUSCA and MOLLUSCOIDA (Ascidians, Brachiopods and Polyzoa). The branch of Radiata is subdivided into the ECHINODERMATA and CELEENTERATA (Aculephs and Polyyps), while the Protozoa, the fifth subkingdom, added since Cuvier's time, are subdivided into INFUSORIA and PROTOZOA. Thus out of the wilderness of classes into which we plunge at the beginning of the work, he finally presents us with a hasty view of eight branches, or subkingdoms, of the animal kingdom. All the lower subkingdoms he considers as the equivalents, or nearly so, of the Vertebrates for instance, though he expresses some doubts as to the permanency of one—the *Infusoria*—as a distinct primary division. Here we see carried out to its last term the tendency of the naturalists of the present day to subdivide, and, as it were, to look at nature by piecemeal. The same tendency is manifested in the students of a special order, or family, to multiply orders, families and genera to what seems to us an unwarrantable extent, and is as much due to the want of powers of generalization and combination as to the new facts and improved methods of study, which many claim make such innovations necessary. We are glad to see such iconoclasts arise, and doubts thrown

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\* An Introduction to the Classification of Animals, by T. H. Huxley, LL. D. London, 1869. 8vo, pp. 147. \$1.50 gold.

over classifications usually accepted, and groups of facts broken up and scattered, believing that another master mind like Humboldt's, or Cuvier's, will arise in the years coming to recrystallize them and demonstrate anew the number and succession of the grand types of the animal kingdom.

Not agreeing with the view of Huxley, who would split up the Mollusca into two branches (believing that though degraded, the Ascidians, Brachiopods and Polyzoa are true mollusks) nor in the "subregnal distinctions of the *Cœlenterata*," which Frey and Leuckart have attempted to demonstrate, let us examine the author's views regarding the classification of the Cuvierian Articulata, and seek the reasons of his adopting Siebold's view that the Vermes (in the Linnæan sense) should be separated as a distinct subkingdom, equivalent to the Vertebrates for instance, and thus the Cuvierian branch of *Articulata* be demolished. In the arrangement of the classes of the Articulates, the author retrogrades nearly a quarter of a century, and in that of the Insects, more than that time. This is due perhaps to his having studied the members of this type less than the others, and being consequently dependent on the labors of other naturalists. The views of Leuckart, which have been so ably seconded by Professor Agassiz, that the Articulates should be distributed into three divisions, or classes, according as the body is worm-like, *i. e.*, a simple cylindrical sac, not subdivided into different regions, as in the Worms; or differentiated into two regions, as in the Crustacea; or three, as in the Insects, is founded upon a much broader and more comprehensive principle in the classification of these articulated animals than any the author suggests in this work. The body of the typical articulate is a cylindrical sac, subdivided by infoldings of the integument into more or less equidistant segments, and the form and relative position of the internal organs are subordinated to this articulated, or segmented, plan. This structure is shown in the higher Annelids, as well as in the Insects and Crustacea, and though less frequently in the lower worms, yet in the tape worm the body is distinctly segmented, and the Turbellaria are too closely allied to the segmented Leeches (*Discophora*) to be placed in a separate subkingdom by a series of negative characters such as the author proposes. The Myriapoda and Arachnida are considered as classes, equivalent to the Insecta and Crustacea. The direct homology of the adult forms of Myriapods and Arachnids with the insects, and more especially the significant facts that the young of these two groups are, when first hatched, hexapodous, and that the embryology of the Arachnids is almost identical with that of the insects, are not mentioned by the author. He also subdivides his subkingdom "*Annulosa*" into the *Arthropoda* (a term proposed by Siebold in 1848) and *Annelida*, for which we could never see any good reason; both Insects and Crustacea in their retrograde genera sometimes assuming worm-like forms, a proof of the unity of type in the three classes. The worms seem to us to stand in the same relation to the insects and Crustacea, as the fishes do to the Mammalia.

Now in subkingdoms, as well as in classes and orders, or families and

genera, there are two series of forms, the higher and the more degraded. In the type of Articulates the Flea is a degraded Mycetophilid, so to speak; the Podura is a degraded Neuropterous insect; the Tardigrades, by some naturalists placed among the worms, are degraded mites, to be ranked near Demodex; as in suborders so in families, the wingless Boreus is a degraded Panorpa. There is the greatest range of form within these subdivisions, and we judge of the relationship and position in nature of the lower by their relation to other and higher forms. Following out the principles of Prof. Huxley, by looking at the results of his methods of inquiry, we should go back to the times of the first quarter of this century, and assign the flea to a distinct order; also the Stylops, an undoubted Coleopterous insect, to a distinct order (as he really does). With as much reason does the author separate the lower worms (Annuloida) from the Annelida (in the Huxleyan sense), or separate the Echinoderms from the Radiata, and place them next to the Annulosa; and assign the worms to a division equivalent to the Insecta and Crustacea combined (Arthropoda). We would question whether this "conduces to the formation of clear conceptions in zoölogy." Rather do we think that it is a retrograde step to the pre-Cuvierian times of Linnaeus and Lamarck, when the animal kingdom was a confused mass of classes and orders, with no glimpses of archetypal forms, or hints of an idea, or plan, combining these classes into grand types.

In the arrangement of the insects we are led back some thirty, or more, years to the times of Kirby and Spence, and Leach, though the author is probably indebted largely to Gerstaecker's classification, in Peters and Carus' Handbook of Zoology, representing, perhaps, the Erichson and Siebold school.

The Coleoptera are placed at the head of the Insects, and the Hymenoptera, Lepidoptera and Diptera are interposed between the beetles and the Hemiptera, though there is so much in common between these two last orders, and the Orthoptera and Neuroptera, in the structure of the imago. Beyond the Hemiptera all is uncertainty and confusion, and the toil of entomologists for the last thirty years seems in vain, as our author clings to the obsolete classifications of over a quarter of a century back. Prof. Huxley still retains the old orders "Strepsiptera" for the Coleopterous family Stylopidae, in spite of the opinion of the ablest and most philosophical coleopterists of the present day; his characters defining the group being mostly negative.

The strangest, and humanely speaking, saddest feature of his classification is recognizing the Neuropterous family, Phryganeidae, as an "order" (Trichoptera), when their affinities to the Panorpidæ are so well acknowledged by the best neuropterists. Why the Neuroptera (in the sense of Siebold and Erichson) are placed above the Orthoptera we are not told. The Orthoptera, according to Huxley, embrace, — *a*, the restricted Orthoptera (Cockroaches, Mantides, Leaf and Stick Insects, Grasshoppers and Locusts); *b*, the Dermaptera (Forficulariæ); *c*, the Termitinæ (the Pso-

cidæ are not mentioned by the author); *d*, the Perlariæ; *e*, the Ephemeriðæ, and *f*, the Libellulidæ. Three groups remain, "which do not fit well into any of the preceding assemblages,"—*a*, the *Physopoda* (Thrips) [which are simply degraded Lygæid Hemiptera]; *b*, the *Thysanura* [which are unquestionably degraded Neuroptera], and *c*, the *Mallophaga*, or bird-lice [which again are degraded Hemiptera and are so recognized by many eminent entomologists, beginning with Latreille.] This arrangement, so arbitrary and unphilosophical, the author evidently borrows from Gerstaecker in Peters and Carus' Handbook of Zoology. Again, for what reason are the *Arthrogastra* (Scorpio, Chelifer, Phrynus, Phalangium, and Galeodes) placed above the Spiders (Araneina), when structurally they are so obviously inferior to the latter, as the embryology of the two groups (of which not a word is said) decides with so much certainty?

We imagine the author treats that strange form, *Sagitta*, much as Thrips and the Case-flies are disposed of, because it does not "fit well" into some other order or class, not agreeing, forsooth, with the ordinary "definitions" of such order or class (these "definitions" are the bane of zoology studied as a science.) It is, indeed, thrown into a separate class, the *Chatognatha* of Rudolph Leuckart, and placed between the worms and Crustacea. Would it not be as philosophical to wait until the embryology of this singular form had been studied before isolating it from either the Crustacea (for it may turn out to be a Copepodous crustacean allied to *Penella*, as Prof. Agassiz has suggested) or the Annelida, where the weight of authority perhaps locates it.

This book, so interesting and suggestive, yet so unsatisfactory, marks a transitional era in zoölogy. Many of the author's views had been published long before the appearance of the present manual, but the volume has been received with such an unquestioning spirit by certain English reviews, that we must enter our protest against many of the author's opinions regarding classification; and if the Cuvierian "branches" are to be demolished, do let us have a reasonable classification substituted, instead of a confused mass of classes and orders, and almost entire disbelief in the existence of archetypal forms, and ideas in creation—for such surely is the tendency of the book.—*To be concluded.*

GUIDE TO THE STUDY OF INSECTS. \*—This work, which has been over a year in going through the press, appearing in numbers, has at length been completed and issued from the Naturalist's Book Agency. It comprises 700 octavo pages, with 651 wood-cuts, and eleven plates, illustrating in all 1,238 objects. It is accompanied by a glossary of entomological terms, a calendar of the monthly appearances of insects, and a copious index. Regarding the classification adopted the author states in the preface:

"The succession of the suborders of the hexapodous insects is that proposed by the author in 1863, and the attention of zoologists is called to the division of the Hexapods into two series of suborders, which are characterized on page 104. To the first and highest may be applied Leach's

\* A Guide to the Study of Insects. By A. S. Packard, Jr., M. D. 8vo, pp. 700. 1869. Naturalist's Book Agency, Salem. Price, bound, \$6.00.



term **METABOLIA**, as they all agree in having a perfect metamorphosis; for the second and lower series the term **HETEROMETABOLIA** is proposed, as the four suborders comprised in it differ in the degrees of completeness of their metamorphoses, and are all linked together by the structural features enumerated on page 104.

The classification of the Hymenoptera is original with the author, the bees (Apidae) being placed highest, and the saw-flies and Uroceridae lowest. The succession of the families of the Lepidoptera is that now generally agreed upon by entomologists. Loew's classification of the Diptera, published in the "Miscellaneous Collections" of the Smithsonian Institution, has been followed with some modifications. Haliday's suggestion that the Palicidae are allied to the Mycetophilidae gives a clue to their position in nature among the higher Diptera. Leconte's classification of the Coleoptera is adopted as far as published by him, *i. e.*, to the Bruchidae; for the succeeding families the arrangement of Gerstaecker in Peters and Carus' "Handbuch der Zoologie" has been followed, both being based on that of Lacordaire. The Hemiptera are arranged according to the author's views of the succession of the families. The classification of the Orthoptera is that proposed by Mr. S. H. Scudder. This succession of families is the reverse of what has been given by recent authors, and is by far the most satisfactory yet presented. The arrangement of the Neuroptera (in the Linnaean sense) is that of Dr. Hagen, published in his "Synopsis," with the addition, however, of the Lepismatidae, Campodea and Peduridae.

The usual classification of the Arachnida is modified by placing the Phalangidae as a family among the Pedipalpi, and the succession of families of this suborder is suggested as being a more natural one than has been previously given.

The arrangement of the Arachnida, imperfect as authors have left it, is that adopted by Gerstaecker in Carus and Peters' "Handbuch der Zoologie." In the succession of the families of the Acarina the suggestions of Claparede in his "Studien der Acariden," have been followed, and in the preparation of the general account of the Arachnids the writer is greatly indebted to Claparede's elaborate work on the "Evolution of Spiders."

Succeeding the preface a page or more is devoted to "acknowledgments," where the author gives the source of each figure in the work. This was the more necessary, as the plan adopted in the two first parts, of giving the name of the person from whose work the figure was borrowed was found to be too cumbersome and expensive.

The "Guide" is already in use in some of our principal colleges and agricultural schools as a text book, or for reference, and seems to have met with favor from teachers and naturalists. The first edition has been about exhausted, and a new one will be issued at an early date. The rapid sale of the book—the first edition being nearly exhausted before the issue of the last part—indicates the large number of lovers of entomology in this country, and the growing sense of the importance of the study of practical entomology by agriculturists.

**ORIGIN OF THE BIG MOUND OF ST. LOUIS.\***—Professor Spencer Smith, in a paper read before the Academy of Science of St. Louis, states that the noted "Big Mound," has at last been laid low, and its substance used to grade a railroad. The destruction of the mound gave an opportunity to study its structure, and Prof. Smith is satisfied that it did not belong to the group of artificial mounds, but was simply a river deposit, formed of parallel and horizontal strata of clays and sand, the same as found on the banks of the river. But few relics were found during the removal of the mound, and nothing, Mr. Smith thinks, that would indicate anything more than that the Indians took advantage of the mound to bury their dead as they would in any high place.

\* Seven pages, 8vo, Oct., 1869. From the Author.

## NATURAL HISTORY MISCELLANY.

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### BOTANY.

GEOGRAPHY OF *PINUS PUNGENS*.—In a note to a paper on "Variations in *Pinus* and *Taxodium*," recently published by the Philadelphia Academy of Natural Sciences, I have given another locality for them: "on the hills north of Harrisburg, along the Susquehanna," and they are probably abundant through the center of the State.—T. MEEHAN.

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### ZOOLOGY.

DOES WITH HORNS.—The doe with horns, mentioned in the July number of the NATURALIST, must have been a very fine specimen, as well as a very marked example of the imperfect development of sex which sometimes occurs, and has been found by naturalists in all branches of the animal kingdom. I saw a few years ago a doe with a pair of horns; it was about eighteen months old, and was in an enclosure on Long Island. In the same enclosure was a buck of the same age; the horns of both animals were so nearly alike that they could not have been told apart. I have heard of others that have been killed in the Adirondacks, the horns being like those of the buck of the second or third year. They are known there as barren does.

The inability to produce young, however, seems to depend on the amount of masculine nature inherited, as the doe that I saw did have one fawn.

Martin says: "In domestic cattle, where the cow produces twins, one being a male and the other a female, the female calf is very apt to be barren, and the external form to resemble that of the ox. A calf of this kind is called a *free martin*, the origin of which name is however obscure. These calves on being slaughtered have been found to be hermaphrodites."

I have seen a peahen that, after it had ceased laying, grew a pair of spurs. Darwin says: "It is well known that a large number of female birds, such as fowls, various pheasants, partridges, peahens, ducks, etc., when old or diseased, or when operated on, partly assume the secondary male character of their species." "A duck ten years old has been known to assume both the perfect winter and summer plumage of the drake." "Waterton mentions the case of a hen that had ceased laying, and had assumed the plumage, voice, spurs, and warlike disposition of the cock; thus every character of the male must have lain dormant in this hen as long as her ovaria continued to act."

The reindeer and caraboo are the only two species of the genus *Cer-*

rus, the females of which always have horns, though smaller than those of the male. Many instances are mentioned, however, of exceptions to this rule. Todd says: "Among the females of the lower animals a similar approach to the male character in the general system not unfrequently shows itself as an effect both of disease and malformation of the sexual organs, and also in consequence of the cessation of the powers of reproduction in the course of advanced age. Female deer are sometimes observed to become provided, at puberty, with the horns of the stag, and such animals are generally observed to be barren, probably in consequence either of a congenital or acquired morbid condition of their ovaries or other reproductive organs. This occurs sometimes also in old age, and, according to Burdach, when the doe has been kept from the male, and at the same time furnished with abundant nourishment.

"In a kind mentioned by Mr. Hay, and which, he believed, had never produced any young, one of the ovaries, on dissection after death, was found to be scirrhus. The animal had one horn resembling that of a three years' old stag, on the same side with the diseased ovary; there was no horn on the opposite side. "In a number of instances where female pheasants had assumed more or less the plumage of the male, the ovaries, on dissection, were found to be diseased." "On the other hand, with male animals it is notorious, that the secondary sexual characters of the male are more or less completely lost when they are subjected to castration." "If this operation is performed on the cock, he does not crow again; the comb, wattles and spurs, do not grow to their full size. The capon takes to sitting on eggs. So it is with hornless cattle, some of which, as they grow old, acquire small horns. "Why in the female, when her ovaria becomes diseased or fail to act, certain masculine gemmules become developed, we do not clearly know any more than why, when a young bull is castrated, his horns continue to grow until they almost resemble those of the cow; or why when a stag is castrated the gemmules derived from the antlers of his progenitors quite fail to be developed."

I have had an opportunity of studying four cases of this kind; one that of a *Cereus Virginianus* castrated when young, has never developed a perfect pair of horns, the first spike of the deer of eighteen months old has never been shed, the original velvet remaining upon it, and a succession of points have been thrown out from the base until the appearance has become like that of two rosettes on his head. Two Wapiti deer that were castrated in September, several years ago, while their horns were full, cast their horns two weeks after the operation, when they would not otherwise have cast them until January or February. The horns immediately began to grow and have never been cast, the velvet has remained on ever since, while the form is very irregular and imperfect. Mr. J. G. Bell informs me that some years since he found a *doe* with horns as large as those of a buck of two years.

I have in my collection the skull and horns of a Wapiti that had been

castrated. They are in the velvet, are heavy and thick, and the branches instead of being pointed are palmated, the palmations being seven inches broad on some of the branches. It is to be hoped, that as public parks and zoölogical collections are being made throughout the country, more attention will be paid to these subjects in this country, and better opportunities afforded to the naturalist than can be had in the woods while hunting.—W. J. HAYS.

THE EGG OF THE GREAT AUK (*Alca impennis*).—Dr. Baldamus announces as the result of recent investigations, that but four eggs of this species are to be found in Germany (one belonging to the Grand Duke of Oldenburg, one to Count Rödern in Breslau, and two to the Royal Museum in Dresden), none in France, two in the Copenhagen Museum, and about sixteen in England, making twenty-two: The Academy of Natural Sciences in Philadelphia had two specimens, but, with praiseworthy liberality, has recently presented one to the Smithsonian Institution. So far as positively known, therefore, less than thirty specimens of the egg of this probably extinct species, are now preserved. The exact number of preparations of the bird itself we are not at present prepared to give. Only three, however, are to be found in America, one each in the Museums of the Academy of Natural Sciences of Philadelphia, of Vassar College, Poughkeepsie, and of the Smithsonian Institution. Of the Skeletons only two are known, one in the British Museum, and the other in the Cambridge Museum of Comparative Zoölogy. Detached bones are, however, found in more or less abundance in the ancient shellheaps of Denmark and other parts of Europe, and of the New England and Nova Scotian Coasts.\*.\*

THE COW BUNTING.—Mr. Martin Trippe, in his article on the Cow Bunting, (*Melothrus pecoris*) in the August number of the NATURALIST; mentions his having heard of but two instances where this bird deposited more than two eggs in a single nest.

On the 15th of May, 1868, I found a nest of the White Crowned Sparrow (*Zonotrichia leucophrys*), of two stories; containing, in the under, a single egg of the Cow Bunting, and in the upper, two more of the same, together with three of the rightful owners. These were being sat upon at the time by the female bird, and on blowing proved to be pretty well advanced in their incubation. Again, this last spring, in the month of May, I found a common Pewee Flycatcher's nest, containing, with three of its own, also three of the Cow Bunting's eggs. One of these last was so forced down into the bottom of the nest as to be almost covered up. This nest I have now in my collection.—H. S. KEDNEY, Potsdam, N. Y.

THE HOUSE FLY.—Years ago I had hundreds of house flies. I think that the perpetuity of the race is provided for in the larval and pupa state over winter, and not by hibernating as adult flies. I have seen the greatest abundance of pupæ late in autumn, when I am confident they did not then transform.—H. SHIMER.

A SINGING MOUSE. — Within the last year I have seen several items in the papers, to the effect that "singing mice" had been caught in different parts of the country, and as the existence of such musicians seems to excite interest, I propose to give an account of one that lived with us about two years ago.

It was in September, 1866, at Newburgh, N. Y., I had noticed in one of the rooms occupied by my family, for several evenings, a fine, chirping sound, so persistent and monotonous as to be annoying, and had supposed it to proceed from one of the small cicadæ that, at that season, had full possession of the shade trees that surrounded the house. Several times I endeavored to find the insect, but ineffectually, the noise seeming to come from different parts of the room, sometimes high in the wall, sometimes on the floor, and ceasing altogether while I was endeavoring to localize it, only to break out afresh the moment I resumed my seat and the room was quiet. This continued more or less for a week, without my being able to learn whence the sound proceeded. At last it invaded my bedroom, which adjoined the other, and for an hour or two together, on one particular night, made sleep impossible. It chanced next morning as I was dressing, the same note issued from an enclosed verandah, the doors of which were open. It struck me as odd that an insect, such as I supposed the musician to be, should sing by daylight. Upon the floor of the verandah were several trunks, and I traced the sound from one to another, till, on lifting gently the lower edge of the canvas cover of one of them, I saw the tail of a mouse protruding. He scampered away to another hiding place, from which forthwith the same notes came. I left the mouse in peace that day, but devised means to entrap him the following night. And sure enough, somewhere about midnight, I waked to hear the same continuous chirping, and presently heard the click of the trap. In the morning the children were greatly excited, and soon found an old dormouse cage, brought from London years ago, made like a squirrel cage with wheel and sleeping box, but all on a scale suitable for mice or dormice, which are alike feeble folks. The captive seemed pleased with his quarters, and soon manifested his content at the quality and regularity of his rations, by singing his unvarying tune at all hours. He warbled after the manner of a minute bird, the throat swelling and vibrating, the mouth closed or nearly so, and the lips in incessant rapid motion, like those of a rabbit. There was nothing like the imitation of any particular bird. We might possibly have fancied otherwise if there had ever been a canary in the house. Nor was there anything that could strictly be called a song. The sound was thin, sharp, but slightly varied, and altogether more like that emitted by an insect. This mouse soon became very tame and familiar with the presence of any of the family. After a few days he became much less restless than at first, was visibly getting fat and lazy, would not take a run in the wheel unless driven to it, and spent a good part of the day sleeping in his little room. In this he hoarded his food in such quantity as to seem to the children

uncomfortable, and therefore he occasionally had to be ejected while his bedding was changed and all made clean. At this treatment he would manifest his displeasure by flying across the cage into the wheel, which he would make spin, emitting all the while his peculiar note with great shrillness and rapidity. And when admitted again after the house clearing, he would be in a state of exasperation, scolding incessantly while busy rearranging things to suit his own mouse ideas. Several times he escaped from the cage, but was as often retaken, as his noise always betrayed him, until at last, after he had been with us six weeks, he escaped once too often and we saw him no more. We supposed he had found his way through the open door into the garden. This mouse was not the common house-mouse, but of a species which frequents barns or lives in the fields, and which was common in our own barn. It was of a light brown, with a whitish belly. Its nose was sharper than that of the house-mouse. On mentioning the subject to a friend, I was told that, some years ago, a house in Catskill, N. Y., was greatly infested with "singing mice," and that it was well known and talked of in the village.

We know so little of the habits of the small nocturnal animals, that it may be possible that these field-mice possess more or less of the musical faculty. The notes of the subject of this paper would pass for the chirping of a cricket, or small grasshopper if heard in the open air, or even in a barn. If heard in a room they would have a certain distinctness, but could not properly be likened to anything so decided and modulated as the song of a bird.

I have looked in vain for any intelligent account of the habits of our field-mice in works of Natural History. In Jesse's "Country Life," London, page 350, is mentioned as follows: "I have been twice to hear the singing mouse. Its song is plaintive, sweet and continuous, and evidently proceeds from the throat. The notes are those of a canary bird, and on questioning the man, I found that one of these birds had been kept in the room in which the mouse was trapped?"—W. H. EDWARDS.

NATURAL SELECTION, A MODERN INSTANCE.—I am a frequenter of the Adirondacks, having hunted there for twenty-one years. The common American Deer (*Cervus Virginianus*) abounds there. About fourteen years ago, as nearly as I can remember, I first began to hear of "Spike-horn Bucks." The stories about them multiplied, and they evidently became more and more common from year to year. About five years ago I shot one of these animals, a large buck with spike-horns, on Louis Lake. In September, 1867, I shot another, a three years old buck with spike-horns, on Cedar Lakes. These Spike-horn Bucks are now frequently shot in all that portion of the Adirondacks south of Raquette Lake. I presume the same is true north of Raquette Lake, but of this latter region I cannot speak from personal observation, having visited it only once.

The spike-horn differs greatly from the common antler of the *C. Virginianus*. It consists of a single spike, more slender than the antler, and

scarcely half so long, projecting forward from the brow, and terminating in a very sharp point. It gives a considerable advantage to its possessor over the common buck. Besides enabling him to run more swiftly through the thick woods and underbrush (every hunter knows that does and yearling bucks run much more rapidly than the large bucks when armed with their cumbrous antlers), the spike-horn is a more effective weapon than the common antler. With this advantage the Spike-horn Bucks are gaining upon the common bucks, and may, in time, entirely supercede them in the Adirondacks. Undoubtedly the first Spike-horn Buck was merely an accidental freak of nature. But his spike-horns gave him an advantage, and enabled him to propagate his peculiarity. His descendants, having a like advantage, have propagated the peculiarity in a constantly increasing ratio, till they are slowly crowding the Antlered Deer from the region they inhabit.

Suppose this had begun several hundred years ago, and the process had been completed before the first white man penetrated the wilds of northern New York, the first naturalist visiting the region would have found of deer, besides the Moose and Caribou, only the Spike-horn. Would he have hesitated to have pronounced it a distinct species, and to have named it as such? And would not naturalists everywhere have followed him? Yet the Spike-horn Buck is but an accidental variety of the *C. Virginiaensis*. Is it probable that the Black-tailed Deer is a more distinct species? How many changes as great as that from the common Deer to the Spike-horn Buck would be necessary in order to produce an animal as different as the Elk, or even the Moose? — ADIRONDACK.

"LILIES OF THE ROCKS."—An article in the August number of the NATURALIST entitled "The Lilies of the Fields, of the Rocks and of the Clouds," contains statements which show the author to have misconceived some very plain zoölogical facts. I allude to his assuming that the hexagonal form of the "microscopic blocks" which constitute a layer of the retina of the eye; and the similar outline of plates of fossil crinoids, are facts which illustrate a natural law similar to that which governs the crystallization of snow-flakes and of certain mineral substances, and which he claims the ability to explain by a new theory of his own.

With no reference to his theory, and no desire to criticise the author unjustly, I merely wish to state that zoölogists have long had what is to them a sufficient explanation of the cause of the forms assumed by those parts of the "animal frame" referred to by him in the article just mentioned. They believe that the normal form of those microscopic bodies which enter into the structure of the retina of the eye is spherical, and that they receive their hexagonal outline by impinging against each other in their crowded condition. So also the plates of all plated Radiates receive their polygonal outlines from the same cause. Their normal outline is circular and undivided, evidence of which may be seen in the inner circular lines upon the very figures of a plate of *Archaeocidaris* which he reproduces from Hall, and which by the way is not a crinoid. These

plates commence calcification within the skin of the young Radiate as circular grains, and increase at their periphery until they impinge against contiguous plates; the number of angles they may have when fully grown being determined by the number of other plates they impinge against. The plate he figures happens to have six, but many others upon the same individual had a different number and their angles were often unequal in the same plate. The hexagonal outline of the microscopic bodies in the retina is uniform in all because they are uniform in size and consistence. The plates of Radiates are not uniform because their points of calcification are usually located at unequal distances. By this it will be seen that the number of angles any plate receives is essentially accidental and bears no relation whatever to the fundamental plan upon which the animal is constructed, which is that of five rays and not six, the number necessary to make it harmonize with the crystalline structure of snow-flakes, etc. — ZOÖLOGICUS.

SAGACITY OF THE PURPLE MARTIN. — In the spring of 1868, a young friend of mine in this city desiring to obtain eggs of the Purple Martin, constructed a nesting-box and hung it out of the window. This box had a hole on the outside for the entrance of the birds, and a hole on the inside through which to reach the hand and remove the eggs. The birds at once appropriated the box, and he succeeded in procuring specimens of the eggs.

This spring (1869) the birds again built in the box, and having secured his eggs, my friend concluded to preserve a specimen of the birds. He reached through the back hole in the box and seized one of the birds, and killed and mounted it. The mate was absent for a day or two, when it returned with a companion, and both birds built a mud wall, shutting up the back hole into the box from which a bird had been taken, and then went on and raised a brood of young. — D. D. HUGHES.

THE CAPTURE OF THE CENTRONYX BAIRDII AT IPSWICH. — On Dec. 4th, 1868, I shot a sparrow that was new to me, on the sandhills at Ipswich. Through the kindness of Prof. S. F. Baird, of the Smithsonian Institution, to whom I sent it for comparison with the *only extant specimen* of the *Centronyx Bairdii* (which is owned by him), it has been proved identical with that collected by Audubon in 1843, on the banks of the Yellowstone River, in the far West.

My specimen differs somewhat in size and general coloration from Prof. Baird's. A detailed description, and the comparative measurements of the two specimens, will be given in a work about to be published, entitled "A Guide to Naturalists in collecting and preserving objects of Natural History," which will also contain a complete list of the birds of Eastern Massachusetts, with critical notes and remarks relative to the localities in which some of the rarer species occur. A life-sized engraving of the *Centronyx* captured at Ipswich will also be given.

I was much interested in a discovery that I made relative to the length



of the claws of the Mud-turtle (*Chrysemys picta* Gray) differing in the sexes. I have examined a large number and found in every case that the claws of the males on the front feet are nearly *twice as long* as those of the female. If we take into consideration the manner in which these animals copulate the reason of this peculiar elongation of the claws of the male is obvious. — C. J. MAYNARD.

PROLIFIC SNAKES. — Various accounts of prolific snakes, from Lancaster County, have come to me during the present season. On the 6th of August a female snake, *Heterodon platyrhinus*, commonly known in this locality as the "Blower," or "Blowing Viper," was killed in Martie Township. From a wound in her side, over one hundred young snakes, from six to eight inches in length, came forth, all very active, all blowing, and flattening their bodies, as is common in the adult individuals of this species. Sixty-three of these young snakes were brought to me in a bottle of alcohol, thirteen were too much lacerated to make good specimens, and the remainder made their escape before they could be secured. We know this species to be oviparous. The question now arises again, "Do female snakes, in certain contingencies, swallow their young?" as has so often been confidently asserted, and as often and as strenuously denied. Mr. Lehman, an intelligent farmer, who was present at the killing, and who brought me the specimens, says that they seemed to issue from an abdominal sack, which was ruptured in the act of killing. An opinion obtains in some quarters, that the same species, under certain circumstances, may be either oviparous or viviparous, or "ovoviviparous," as it is sometimes called. — S. S. RATHVON, Lancaster, Pa.

THE HALIOTIS OR PEARLY EAR SHELL. — In an article, with the above title, in the July number of the NATURALIST, referring to the geographical distribution of the Haliotides, I have stated as a remarkable fact, that although several species are found upon the West coast of North America, not a single species had been found upon the East coast of either North or South America. In the latter part of August, upon the occasion of a brief visit to the Museum of Comparative Zoölogy at Cambridge, I was kindly shown by Count Portales, among other material, a specimen of Haliotis (some one and one-half inches long) dredged, *living*, by him in the Gulf Stream between Florida and Cuba; this is the first instance of the occurrence of the Haliotis upon the Eastern side of the American Continents. — R. E. C. STEARNS.

COW DEVOURING THE PLACENTA. — In the June number of the NATURALIST, in the Scandinavian *compte rendu*, some investigations in regard to animals devouring their after-birth are referred to as novel and interesting. If this be the case, I suppose individual testimony to the same effect may be worth something, and I write to say that I once knew a cow to devour her after-birth, at least so much of it as she was permitted to eat. I have also known cats to go a step farther, and devour the newborn litter. — P.

THE WORM-EATING WARBLER.—In looking over the description of the Worm-eating Warbler (*Helmitherus vermivorus*), in the "Birds of New England" by Mr. Samuels, I see he describes it as nesting in bushes from four to nine feet from the ground, and making its nest with the blossoms of hickory and chestnut trees. I should like to know if these are the usual habits of this bird.

On the 6th of June, 1869, I found a nest of this species containing five eggs. It was placed in a hollow on the ground much like the nest of the Oven bird (*Scirurus aurocapillus*), and was hidden from sight by the dry leaves that lay thickly around. The nest was composed externally of dead leaves, mostly those of the beach, while the interior was prettily lined with the fine thread-like stalks of the hair moss (*Polytrichum*). Altogether it was a very neat structure, and looked to me as though the owner was habitually a ground-nester. The eggs most nearly resemble those of the White-bellied-Nuthatch (*Sitta Carolinensis*), though the markings are fewer and less distinct. So close did the female sit that I captured her without difficulty by placing my hat over the nest. — T. H. JACKSON, Westchester, Pa.

FALL OF SHELL-FISH IN A RAIN STORM.—Mr. John Ford exhibited to the Conchological Section, Academy of Natural Sciences, Philadelphia, specimens of *Gemma gemma*, remarkable as having fallen accompanied by rain, in a storm which occurred at Chester, Pennsylvania, on the afternoon of June 6th, 1869. The specimens were perfect, but very minute, measuring one-eighth inch in length by three-sixteenths inch in breadth. Though most of the specimens which fell were broken, yet many perfect ones were collected in various places, sheltered from the heavy rain which followed their descent. A witness of the storm, Mr. Y. S. Walter, editor of the "Delaware County Republican," assured Mr. F. that he noticed the singular character of the storm at its very commencement, and to use his own words, "it seemed like a storm within a storm." A very fine rain fell rapidly, veiled by the shells, which fell slower and with a whirling motion. Judging from the remains of animal matter attached to some of the specimens, together with the fresh appearance of the epidermis, it is highly probable that many of them were living at the moment of transition. This minute species resembles a quahaug shell, and is common on the seashore between tide marks.

NYCTALE ALBIFRONS.—I do not know whether, since the discovery made by Dr. Hoy, of Racine, Wisconsin, in regard to *Nyctale albifrons*, another of this beautiful and rare species has been taken within the limits of the United States. A few days ago a live and well plumaged specimen was captured in the centre of the city of Buffalo, by George L. Newman, Esq., of that city, and presented to the Society of Natural Sciences. I am sorry to add that the bird lived only two days in captivity, and it forms now a very valuable addition to the ornithological collections of the Society. — CHARLES S. LINDEN.

A FIDDLER-CRAB WITH TWO LARGE HANDS. — A male "Fiddler" with nearly equal hands has recently been presented to the Museum of Yale College, by Mr. W. C. Beecher, who collected it near this city. It does not appear to differ from the common *Gelasimus palustris* except in the right cheliped. The left cheliped is exactly like the larger cheliped of ordinary specimens, while the right one differs only in being a very little smaller, and in having the fingers slightly more incurved at the tips. In this character of equal chelipeds it agrees with the genus *Helæcius*. The specimen was very lively, and used both hands with equal facility. — S. I. Smith, *New Haven, Conn.*

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## PROCEEDINGS OF SCIENTIFIC SOCIETIES.

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CHICAGO ACADEMY OF SCIENCES. *Meeting of October 12th, 1869.* — The President exhibited some implements of stone and shell, forming the surgical kit of an Apache Medicine-man, killed in a recent skirmish with United States troops. The stone implements were all of carbonate of lime cut from a beautifully striped stalagmite. Four of them apparently constituted a set of tamponers, the slender flattened ones being used for plugging wounds made by arrows, and a larger cylindrical one for gunshot wounds. The surgery of the Apaches is based upon the idea that the chief danger of a wound is from the loss of blood, and plugging, aided by incantations, etc., constituted the whole of their resources. One of the stones is probably a charm, as it represents an animal, probably the Texas Armadillo, and it is ingeniously cut, so that the bands of color correspond to the transverse rows of scales. The shell is a large *Oliva* from Lower California, perforated and suspended by a string.

Dr. Stimpson gave an account of his experiments, during the last three months, upon a solution of carbolic acid as a substitute for alcohol in the preservation of wet specimens. The results had been gratifying, and promised a relief from the chief burden of expense in carrying on large zoölogical museums. He found that deliquescent crystals of the acid dissolved in forty times its bulk of water gave a fluid which equalled alcohol, in its preservative qualities, at less than one-twentieth the cost, with the additional advantage of keeping the specimen far more nearly in its original condition, as to the color, etc. And very curiously (this is, however, not enumerated among the advantages) the peculiar smell of the fresh fish is retained in specimens of trout which had been kept for several weeks in the fluid. The qualities of the substance (more properly an alcohol than an acid), which is a great enemy of all protozoic and protophytic life, depend upon its powerful action in destroying the germs associated with, if not the cause of, decomposition. In a solution of

twice the strength above mentioned—the saturated solution—the specimen itself is soon destroyed. Specimens should be first placed in a very weak solution, say one-half per cent., but as the action of the acid is very rapid, it may be daily changed for a slightly stronger one, until the full strength (two and one-half per cent.) is reached. This should be done to prevent the contraction resulting from the sudden contact of a strong solution, and preventing endosmosis. Fluids once used will be found to have lost their preservative power in a considerable degree far more than in the case of alcohol, and must be strengthened before being used again. After specimens have been completely permeated with the solution, say in three or four weeks, they may be kept in pure water for a considerable length of time without showing signs of decay. A fluid containing one-half per cent. of the acid will probably be found sufficiently strong for the permanent preservation of specimens previously prepared in the stronger solutions and kept in tightly closed jars. The freezing of the fluid may be prevented by the addition of one-eighth part of alcohol, which will be found sufficient for the extreme of temperature to which museum rooms are ordinarily subject in this country. If the smell of the carbolic acid, which is very slight in the weak solutions, should be objected to, the addition of a minute quantity of the oil of wintergreen will cover it completely.

Carbolic acid will be found valuable on expeditions for zoological purposes, where the transportation of the necessary alcohol has heretofore formed a heavy item of expense. A few pounds of the crystals may be carried in a trunk, and be always at hand for use. Large fishes, etc., should be injected with the fluid in the mouth, intestine and cavity of the abdomen, and if possible in the larger blood-vessels. Inferior qualities of the acid may be obtained at a low price, and a clear solution obtained therefrom by filtering. The solution is an excellent thing for filling up old specimen jars from which the alcohol has nearly evaporated. All germs of mold are instantly killed, and the specimen needs no other preservative.

The experiments mentioned above were to be continued, with the view of ascertaining whether the solution was equally reliable for a longer period.

Specimens were exhibited illustrating the preservative qualities of the fluid.

Dr. Stimpson also made some remarks upon the shell-mounds of West Florida, particularly those of Tampa Bay, which he had examined during the past winter and spring. These mounds were of great extent, some covering many acres of ground, and reaching a height of forty or fifty feet. Some of them were distinctly stratified, which characteristic has probably misled the only scientific writer\* who has as yet mentioned them, and caused them to be regarded as of natural formation.

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\* Conrad, American Journal of Science, [2] I. 1846. ( ) p. 44.

The largest of these mounds are peculiar in their character, differing from any shell-mounds yet described. They are not *kjækkenmøddings*, i. e., simple accumulations of kitchen refuse, of shells rejected after the consumption of the soft parts, but seem to have been built for a purpose; shells being used as the most convenient materials at hand. They have even been increased in size, and raised in height from time to time, as evidenced by the occurrence at different levels of dark colored strata of true *kjækkenmøddings*; charcoal, bones, pottery, such as implements of shell, etc. The masses of shells between these strata are entirely free from such materials, and are always four or five times as thick as the dirt bed. The shells, too, are not such as indicated merely the *rejectments* of aboriginal feasts, being of all sizes from that of *Littorina* to that of *Busycon*, and often showing evidence of having been dead when placed in the mound; some, indeed, showing remains of barnacles attached to their inner surfaces. Dr. S. believed these mounds—some of them at least—to have been built as places of refuge during the great inundations of the sea to which the coast region of West Florida, for miles inland, is even now subject in violent storms. The additions to the mound made by the people who dwelt upon them may have been occasioned by the occurrence of an inundation of greater height than was known in their previous experience.

Dr. S. exhibited a number of specimens taken from a dirt-bed in the mound at the mouth of the Manatee River. This bed was three feet in thickness, and indicated a long residence of the aborigines upon that level of the mound. The bed occurred about midway between the base and the summit of the mound, which was over thirty feet in height. The specimens consisted of bones of fishes, of loggerhead turtles, and of manatees; pieces of coarse, unadorned pottery, and implements made of shell. One of the most curious of the latter was a kind of angur, more than a foot in length, made of the axis of *Fusciolaria gigantea*, by knocking or grinding off the whorls and planing down one side of the handle. The use of this kind of implement is difficult to conjecture. Six of them were found lying together in a kind of pocket beneath a mass of charcoal. An interesting point is that no stone implements occurred in this dirt bed, while they did occur in another bed near the summit of the mound, perhaps indicating an advance in civilization. For the specimens exhibited the Academy was indebted to Mr. E. W. Blatchford, who had defrayed the expenses of excavation.

In the shell-strata of the mound the most abundant species were *Ostrea Virginica*, *Callista gigantea*, *Mercenaria preparca*, *Maetra Ravenelii*, *Cardium isocardia*, *Busycon perversum*, *B. pyriforme*, *Strombus alatus*, *Natica duplicata*, *Cassidulus corona*, *Fusciolaria tulipa*, *F. gigantea* and *Olivella literata*. Some of these shells now occur rarely if at all in the vicinity of the mound, while they are very abundant on the barrier islands of the



Fig. 84.

coast, and in the purer waters of the open gulf. These islands, doubtless, at the epoch of the building of the mounds were of smaller extent, and formed a less considerable bar to the approach of pure sea-water to the coast of the main land.

Major Powell then gave a brief account of his recent exploration of the grand Cañon of the Colorado River, and of the language of the Ute Indians, promising a more detailed account at some future meeting.

Dr. Durham exhibited under the microscope the tongues of several species of aquatic gasteropods found in the vicinity of Chicago, and described the habits of the animals.

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### ANSWERS TO CORRESPONDENTS.

E. S. M., Wading River, N. Y.—Your plant appears to be *Epiphegus Virginiana* Bart., known as Beech-drops or Cancer-root. It is certainly rare, except in the shade of beech woods, where it is usually common enough. It will be interesting to note whether you found it under this or some other tree, as it is supposed to be parasitic on the roots of the beech only. This species is *E. Americana* Nutt., and there is another related plant known also as Cancer-root, and found under the oak.—C. M. T.

W. W. B., Indianapolis, Ind.—Your No 9 is *Pteris critica* variety *albo-lineata*; No. 10 is *Pteris serrata*; the fertile frond, No. 11, is *Adiantum pubescens*.—J. L. R.

E. L. G., Decatur, Ill.—To form a satisfactory judgment upon your oak from the leaves only, is perhaps hardly possible. You omit to state what is the form of the acorns, and particularly whether they ripen the first or second year, which is a very important character. The size of the tree, and the nature of its habitat, as wet or upland, would be valuable criteria. In the absence of these facts, we should suspect, if the fruit ripens the first year, that it was a form, peculiar perhaps, of *Q. castanea*, Willd.; or, possibly, it may be *Q. monticola*, Mx. If the acorns remain over, then it may be a hybrid, as you suggest; and perhaps the curious *Q. tridentata*, Engelmann, though this we should doubt. The study of these natural hybrids is very interesting, and we would recommend you to make your observations as careful and comprehensive as possible.—C. M. T.

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